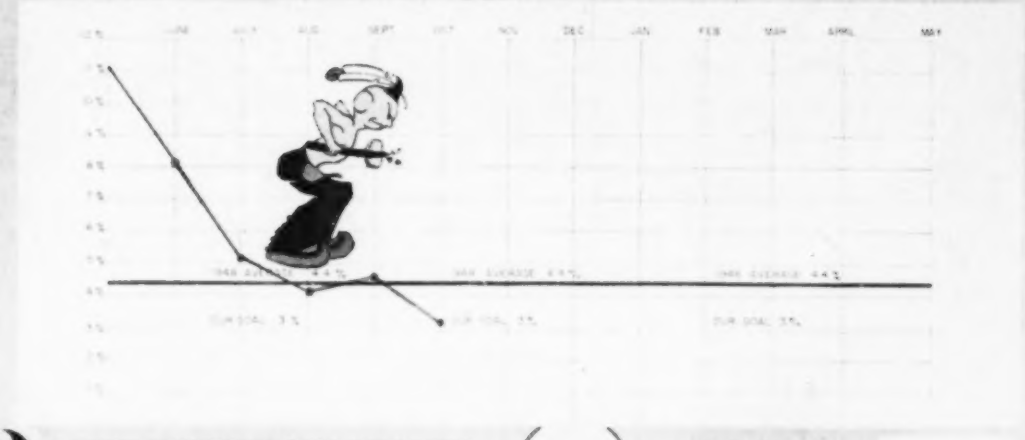
Industrial QUALITY CONTROL

JULY, 1953 Vol. X No. 1, Part I

As Our Quality Improves... *Watch this Scrap Go Down*

PERCENT OF SCRAP IN OUR PRODUCTION



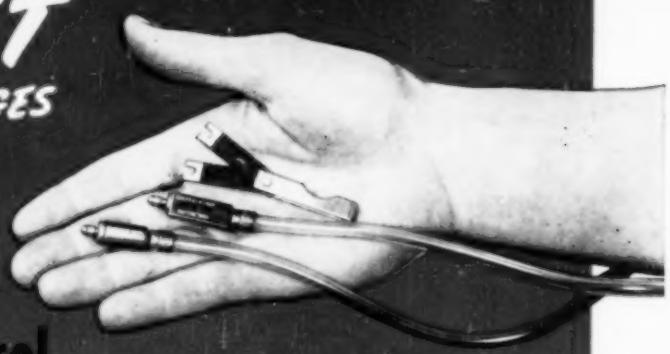
LET'S IMPROVE OUR QUALITY AND CUT OUR SCRAP TO (3 %) AVERAGE % OF SCRAP THIS MONTH 3.1 %

I. Q. Is Good for Me and You!

AMERICAN SOCIETY FOR QUALITY CONTROL

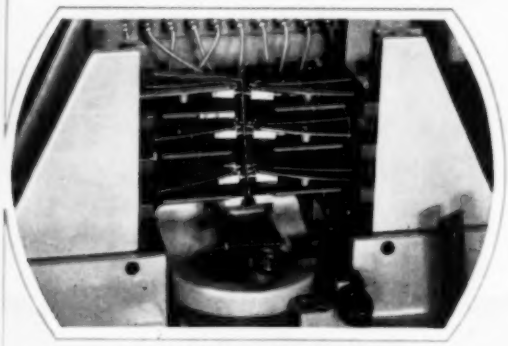
PLUNJET
GAGING CARTRIDGES

WIDELY USED For Inspection and Machine Control



The Plunjet is made with both rectangular and cylindrical short and long housings.

Plunjets with Precisionaire for checking jet engine blades.



Jet blade fixture using Plunjets.

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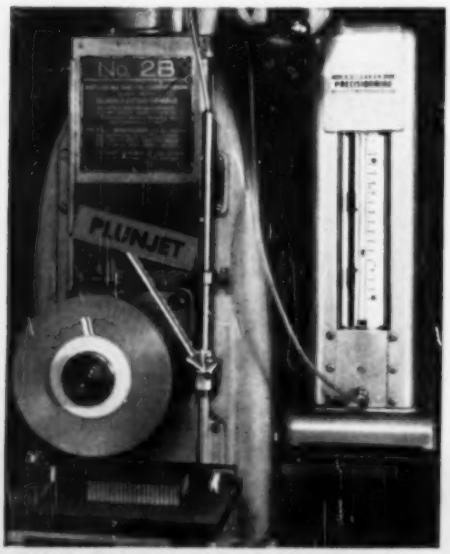

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Industrial Quality Control

Vol. X JULY, 1953 No. 1, Part I

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HUGH M. SMALLWOOD

Hugh M. Smallwood, Member of the Society since 1946, and a Fellow since 1950, died on Monday, 27 April, 1953 after a short illness.

He had been interested and active in the affairs of the Society from the start of his affiliation with it, and he was serving as an active member of the Committee on Professional Ethics and Qualifications and of the Committee on Operations Research, at the time of his death.

His clear and direct thinking and his serious steadfastness of purpose, always tempered by his genial disposition, his pleasant smile, and his keen sense of humor, were an inspiration to all who were fortunate enough to be numbered among his friends. His aid and counsel were always highly respected and valued, and his death is a painful loss to the Society.

Dr. Smallwood was born in Perth Amboy, New Jersey, in 1903. A graduate of Johns Hopkins, he earned his Ph.D. in 1927 while studying under Dr. Harold Urey. From 1927 until 1934 he taught chemistry, first at Johns Hopkins and then at Harvard. In the latter year he joined the United States Rubber Company as a physical chemist, and he served in this capacity until the outbreak of World War II. During this period he became interested in the application of statistics in industry and then in quality control.

In 1941-2 he was in charge of product control at the Des Moines Ordnance Plant and in 1942-3 he was Technical Director of the Eau Claire Ordnance Plant. Both of these were Government-owned small-arms ammunition plants operated by U. S. Rubber for the Ordnance Department of the Army. During the period mentioned, the quality and quantity of their production rated among the highest in the country. In 1944, Dr. Smallwood served as Consultant to the Chief Signal Officer of the Army and had an important part in introduction of Acceptance Quality Control Procedures in the Signal Corps Inspection Agency.

Following the end of the War, Dr. Smallwood returned to the General Laboratories of United States Rubber at Passaic, New Jersey. He had served as a department head since 1945, and had been in charge of Analytical Research since 1952. He had specialized in statistical research methods and in the design of experiment.

In addition to his affiliation with A.S.Q.C., Dr. Smallwood's memberships included the American Chemical Society, the American Association for the Advancement of Science, the American Statistical Association, and the Operations Research Society of America.

Dr. Smallwood made his home in Nutley, New Jersey, and he is survived by his wife, three daughters and a son.

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by the

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Membership in the Society is personal and professional, and is not open to corporations, companies, or other organizations.

Contributions to the Society from corporations, companies, and others for the support of its activities are welcomed and appreciated.

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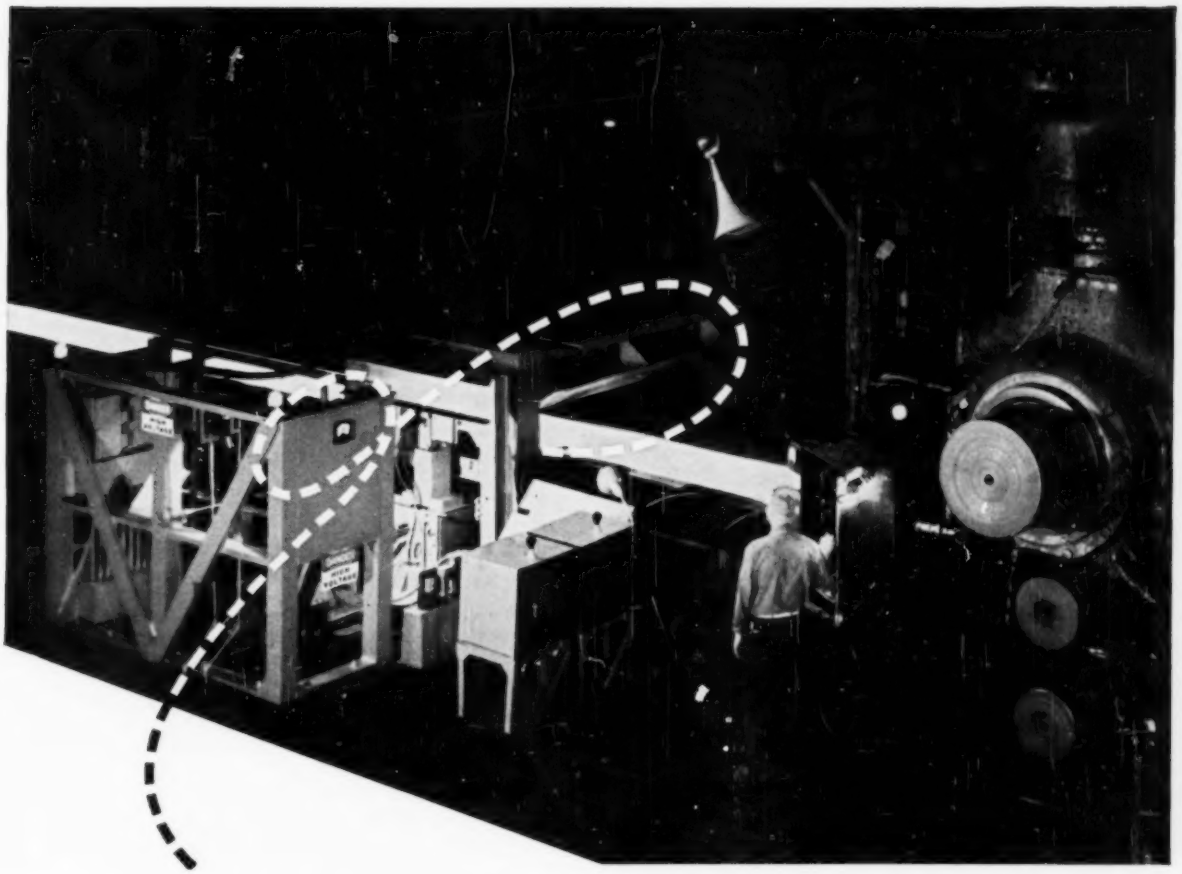

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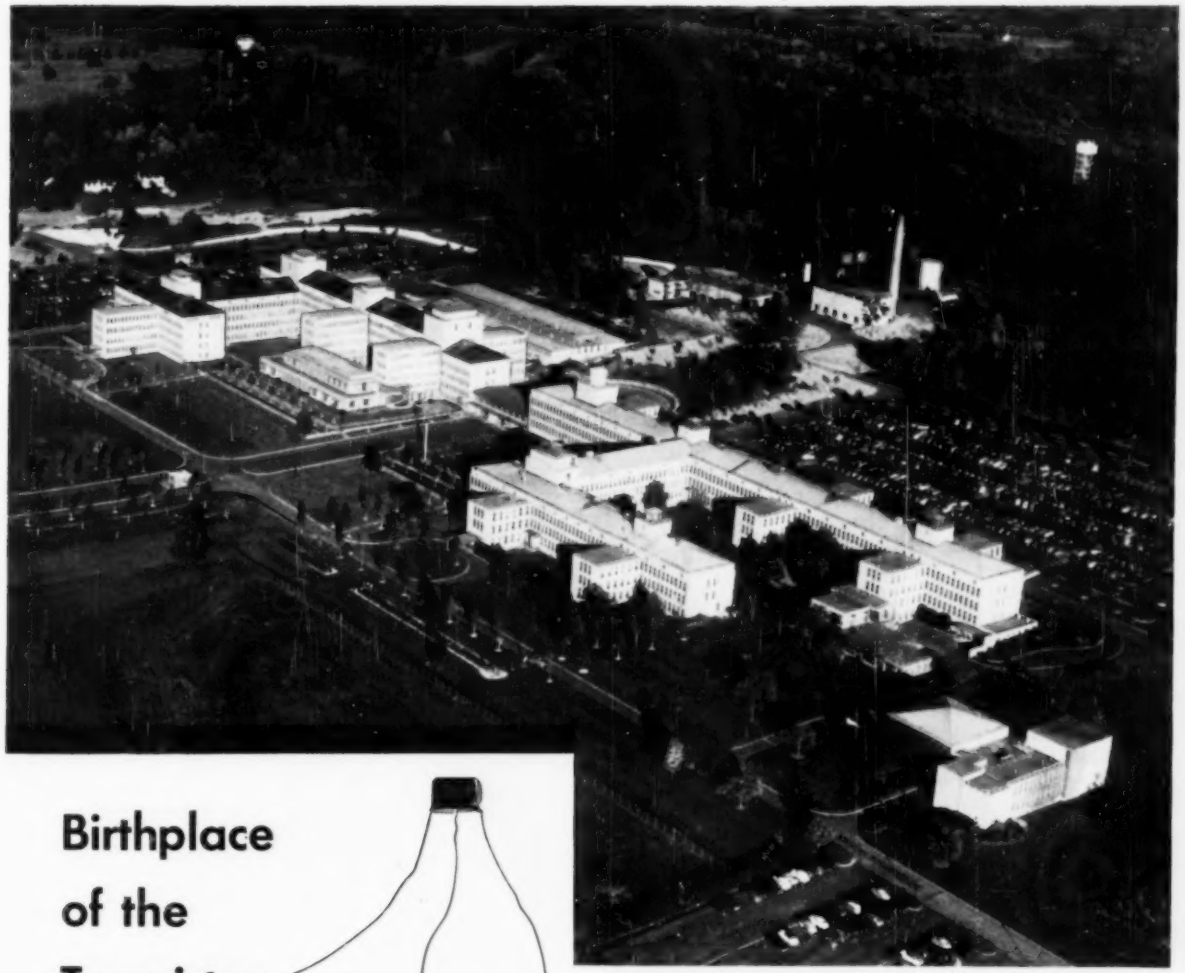
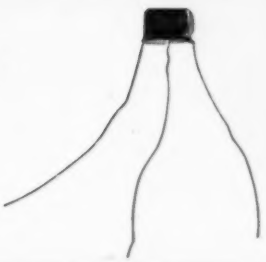


Birthplace of the Transistor



Bell Telephone Laboratories at Murray Hill, N. J. Other laboratories are in New York City and at Whippany and Holmdel, N. J.

The ***Transistor***, that revolutionary new electronics device, is a product of *telephone* research. It was conceived, invented and developed at Bell Telephone Laboratories by men in search of ways to improve telephone service. It was announced just five years ago.

The ***Transistor*** can do most of the things that vacuum tubes can do—and others, too—but it is not a vacuum tube. It works on entirely new physical principles. Rugged, simple and tiny, the Transistor uses incredibly small amounts of power—and then only when actually operating.

Transistors promise smaller and cheaper electronic equipment and the spread of electronics where other equipment has not been able to do the job as economically. They are already at work in the Bell System, generating the signals that carry dialed numbers between cities, and selecting the best route for calls through complex switching systems. Engineers see many other possibilities: for example, as voice amplifiers in telephone sets to aid the hard of hearing, and as switches.

Recognizing the tremendous possibilities of the ***Transistor*** in every phase of the electronics industry, the Bell System has made the invention available to 40 other companies. Thus, again, basic research to improve telephony contributes importantly to many other fields of technology as well.

TRANSISTOR SUMMARY

Basically, a ***Transistor*** is a tiny wafer of germanium with three electrodes, over-all about the size of a coffee bean.

It can amplify signals 100,000 times on much less power than a pocket flashlight requires. This opens the door to its use in smaller telephone exchanges where vacuum tube equipment would be too costly to operate.

Unlike a vacuum tube, the ***Transistor*** has no vacuum and no filament to keep hot. It operates instantly, without "warm-up" delay. The Transistor can also be used as an electric eye and to count electrical pulses.

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Improving telephone service for America provides careers for creative men in scientific and technical fields.

Achieving Quality-Mindedness Through Employee Communications*

H. E. THOMPSON

Anaconda Wire & Cable Co.

THIS article does not touch on Statistical Quality Control. Instead, it deals with another technique which I think is closely related to it. This technique has been used effectively by our company to improve the quality of our products, along with statistical methods. By supplementing the work you are now doing with statistical methods with some of the techniques we have used, you may be able to stimulate greater interest and obtain better results from your present program.

Our program is based primarily on the assumption that employee attitudes and quality performance go hand in hand. We feel that whether you use SQC or any other technique designed to improve quality, the whole thing can fall flat on its face if the real desire to improve quality is missing. And even though your present quality is considered to be good, it will be just that much better through the years if employees are quality-minded.

Before discussing my company's program for achieving quality-mindedness, it is important to outline briefly the preliminary steps that we took to win the supervisors' and employees' acceptance of such a program.

First of all, much of the success of the program depends on whether the supervisors feel that they are in fact, as well as name, part of management. Our company set about specifically to do that with a comprehensive employee relations program built around the supervisor as the key man. Steps were taken to develop a better understanding between management and employees by telling them about company problems and giving them a chance to participate in various ways. This can best be done by having your director of personnel trained in this field or hiring an employee relations counselor to work with him. Some of the activities that will help create a receptive attitude for a good quality program are such things as:

Service Award Dinners for 10, 15, 20 and 25-Year Employees
Bulletin Board Information—Company news of interest to all employees
Open House or Family Days
Letters to employees' homes on subjects that affect the company and their own jobs
Employee Manuals on company policy indicating what they can expect from their jobs and what the company expects from them
Supervisor Conferences—Round table discussions about subjects supervisors deal with in their day-to-day work
Management Bulletins
A Suggestion System
Annual Interviews

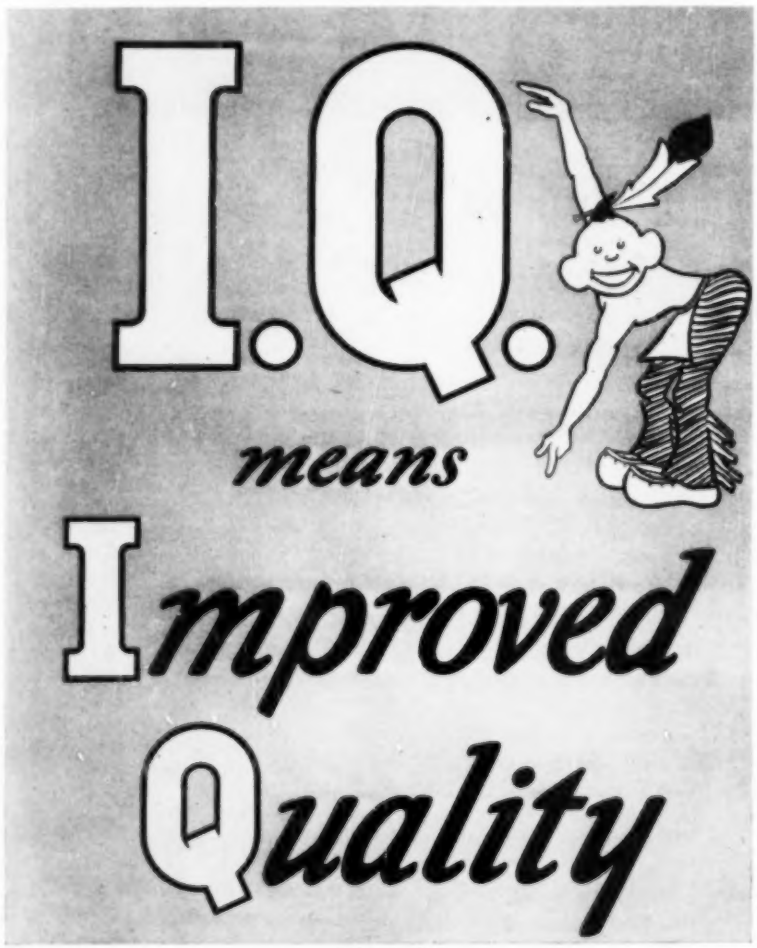

Figure 1

*Paper presented on the program of the Sixth Annual Convention of ASQC in Syracuse, New York, May 1952. This paper is exempt from all copyright restrictions and may therefore be reproduced without formal request for copyright release. It is understood that reproductions under this copyright exemption will carry appropriate source credit to both the author and *Industrial Quality Control*.

In other words, there must be established a continuous flow of information about the company and its policies, problems and plans. Having laid the groundwork for direct communication with employees, you are ready for a quality program.

We have seven manufacturing plants in various parts of the country, all of which manufacture wire and cable for electrical use. So we started by having each Plant Manager estimate the amount of savings he thought his factory could effect by a realistic effort to improve quality. All these estimates together totaled almost one million dollars. This amount of money, or even half of it, is certainly worth trying to save and thereby make our company more competitive on price. We, therefore, felt that we had a sizable goal to strive for.

At the very outset the purpose of our Improved Quality program was to achieve and maintain improved quality in Ananconda Wire and Cable products, and by so doing reduce scrap, rework, and excess use of materials, which in turn will improve production efficiency, increase customer acceptance, and help to create sales.

There were two chief objectives in this campaign, both stressing the human equation.

1. To make every employee "quality conscious" by clearly defining to him just what Anaconda quality is—making the best product at the lowest cost, using the materials and standards specified for that product —and to show our men and women the direct bearing that quality has on production, sales and job security, on the basis that improved quality actually costs less and improved quality makes sales and sales make jobs.
2. To show every employee specifically how to get and maintain improved quality. This second objective dealt with specific problems of how to attain better quality.

This company-wide program ran for 12 months in each plant, and it was conducted by using posters, letters to employees, publications, displays, slogan contests with local newspaper publicity, and scoreboards, in order to get the message across to the men and women in the shop.

The program started in each of the plants with a personal presentation of the quality objectives by the Executive Vice President at a meeting of the management group in each plant. At this meeting, the local Plant Manager outlined to his supervisory staff the plant's objectives of the goal to be achieved in terms of reduction of scrap, rework and excessive use of materials, and announced the selection of a Quality Committee to direct the program in the plant. The Headquarters Quality Control Department administered the program and handled the details of coordination, assisted by our Industrial Relations Department and a consultant in the field of Industrial and Community Relations.

Let me explain the conduct of the campaign. First of all, the program started with a teaser poster campaign to arouse interest. A series of three posters were used. These posters were placed in each department in each plant at two-day intervals. The first poster featured the question, "How's Your I.Q.?" The second poster, appearing two days later, read "Sure, a High I.Q. Leads to Success". Two days later a third poster, shown in Fig. 1, explained for the first time the meaning of the letters "I.Q.", which is Improved Quality.

On the day that the meaning of "I.Q." was revealed in the last poster, each Plant Manager sent a letter to each employee's home explaining the purpose of the campaign and stressing the importance of quality as it affects job security and seeking the assistance of each employee in improving quality.

After this teaser poster series, a fourth poster (Fig. 2) emphasized the relationship of Quality, Sales and Job Security, and this poster remained for a longer period of time in the various departments, and then was replaced with other posters from time to time carrying a similar message.

So much for the build-up.

Now here is the guts of the program.

Special "What Happened" displays were set up periodically in the various departments (Fig. 3) to dramatize the causes of rejections and to show how they could be prevented. These posters were used to point up specific production mistakes over which the operator had control and then showed him how to avoid similar mistakes in the future. With each example of poor workmanship, several constructive points were made which it was expected would help to prevent a recurrence of the condition displayed. In some cases, actual customer complaints were dramatized. During the program over 300 such displays were made. Another poster was displayed whenever there was occasion to give a department or plant a pat on the back.

Figure 2

Figure 3

Figure 4

Another important promotional device was the use of I.Q. Tips. These were used by supervisors in each department to carry a message over his own signature through posting it on the bulletin board in his department. These I.Q. Tips carried specific messages to the operator through the written word of the foreman to supplement his oral instructions in securing satisfactory workmanship. Over 300 of these messages were posted.

Scoreboards were set up in the individual departments to keep the employees advised of their progress in cutting down rejects and spoilage in improving the department's quality record. Most of these scoreboards were on a weekly basis. In addition, each plant had a plant-wide scoreboard which totalized the progress of the campaign toward achieving the plant's goal in terms of reduction in scrap. An example of one is shown on the cover picture of this issue.

These scoreboards were maintained on a monthly basis in such a manner that the results of each month's efforts showed the pounds of scrap produced to the pounds of material put into production, compared with the previous month's record and the goal to be achieved.

In order to develop interest in the job, other displays were made to show the end use of our products, both by pictures and by the actual equipment in which our products are used. These displays were very effective in bringing home to our men and women the importance of quality of our products in the successful running of machines and equipment that each of us uses in his daily life. Many of these displays were loaned to us by our customers. Here is where our Sales Department participated. It gave them an opening to talk I.Q. to some of our good customers in order to obtain material to assist the program. Pictorial displays of Anaconda wire in use were posted regularly in all departments.

Raw material displays were made to develop greater interest in the materials our men handle every day and to drive home their cost to encourage them to reduce waste. There were 21 different raw material displays.

During the progress of the campaign, a publication was issued called I.Q. NEWS, devoted to the news of the campaign. The purpose of the publication was to provide an exchange among plants for improving

quality and to keep enthusiasm and interest at the local plant at a high level. A copy was sent to each employee's home about once a month.

Management News Bulletins carried messages to supervisors from the Executive Vice President concerning the progress in each plant.

In the regular established suggestion system, double awards for suggestions which would improve quality were given during this campaign.

A slogan contest was conducted in each plant with a $25 prize going to the winner. Some plants gained favorable publicity on this through the local papers. The winning slogan in each plant was used very effectively in displays and on posters.

The Quality Committees in each plant showed a lot of ingenuity to keep interest alive. For instance, in one plant a fluorescent plexiglass "I.Q." sign was installed at the time clock, and across the face of each time card was stamped the slogan, "Quality First in All We Do." Another plant used a printed slogan on each employee's time card. It said "Work for I.Q.—It will work for you." At still another plant each production order carried a sticker which said "Put I.Q. in all you do."

Even though this campaign was designed primarily to appeal to the operator, we were impressed with the interest shown by supervisors. For instance, at one plant the foreman of the Stranding Department developed a better means for matching lengths of conductor by using a diameter, weight, length table. This reduced the amount of scrap at the stranders.

In another plant the assistant superintendent reported that through their periodic foremen's meetings on scrap, they were able to analyze scrap to the point where they now have more knowledge of what is normal scrap per spindle than they have ever had before.

At still another plant the superintendent reported that increased interest of foremen in the problem of reducing scrap was obtained by means of department scoreboards and through periodic meetings.

This, of course, was also true at another plant where before this program started the superintendent had been making an intensive drive at the supervisory level for increased quality. His program went forward hand in hand with the I.Q. campaign, with very definite gains being made.

At each plant the manager or superintendent had regular meetings with the Quality Committee to discuss the activities of the campaign.

There were many instances in all the plants which showed an increased interest by everybody in the factors being stressed in this campaign.

The important question is—what has been accomplished? This is a very difficult thing to evaluate since there are so many factors that enter into it. For instance, a reduction in the use of excess material effected by Statistical Quality Control activities in the various plants has contributed to progress toward the goal. And then, of course, the amount of savings made in rework is difficult to analyze except over long periods of time. Furthermore—and this is important—no one will ever be able to measure in dollars the amount of customer good will gained because of improved quality.

Well now, how much if any of that goal was achieved in this I.Q. campaign? In order that we could have some idea of possible effects of this program, an analysis of the business statements of the various plants was made to determine the actual scrap cost during the year compared with the previous year. The individual plant managers reported their estimated savings in rework and material costs. The total of these figures indicated a large dollar saving for our company and showed an achievement of 68 percent. However, when adjustment was made for volume of business, it represented an achievement of 81 percent.

I've talked a lot about scrap reduction and you may get the idea that this was a scrap drive. Well, we were using scrap as an indicator because there is a close relationship between preventable scrap and the general level of quality. The fewer defectives we find in inspection means the less chance that the customer will find defective material in the shipments he receives from us.

Another indication of results is the fact that there was a reduction of 25 percent in the number of substandard reports issued by the Inspection Department during the 12 months of the campaign over the preceding 12 months.

Even though the program was designed to appeal to the men on the machine, it had a very fine influence throughout the whole organization. But probably most important of all is the fact that we have succeeded in developing habits and attitudes toward quality which we feel will be with our company for a long time to come.

An Example of Vendors' Certification*

AUGUST B. MUNDEL

Sonotone Corporation, Elmsford, N. Y.

A VENDOR'S certification of the quality of his product should include the five items outlined by M. E. King.† This article shows an adaptation of vendor certification applied to a specific product. The Sonotone Corporation furnishes manufacturers of television picture tubes quality data on the electron guns they purchase from us. This example of vendor's certification has several aspects which are different from most certifications since the product cannot be individually evaluated except by the use of destructive test.

Most of the products that are manufactured by the Sonotone Corporation can be tested for all characteristics at our plant and at customers' incoming inspection. The electron gun for the television picture tube is an obvious exception. The electron gun consists of a cathode and a control system. The cathode is the source of electrons, which strike and light the screen of the picture tube, but the cathode cannot emit electrons until it has been sealed into the picture tube

†M. E. King, "Vendor Certification," *Industrial Quality Control*, Vol. IX, No. 6, May, 1953 pp.

*Paper presented on the program of the Sixth Annual Convention of ASQC in Syracuse, New York, May, 1952.

blank, the tube thoroughly evacuated and the cathode processed to convert its coating into the oxides which are emissive. The electron gun is the heart of a picture tube and therefore the loss per defective unit is large. The product cannot be tested individually before use in the tube. The customer's processing can adversely affect the quality of the tube and be misinterpreted as the failure of our product, the gun and cathode. Due to these factors a lot by lot record is not as important as a continuous record with a good process average. Accordingly, emission checks were started on samples from each cathode lot and a process average for the product obtained.

Although the first electron guns manufactured and sold were satisfactory, manufacturing and selling guns in larger numbers produced some customer complaints. Despite our systematic checking of samples from each cathode lot by sealing, exhausting, and processing random samples before releasing a lot to the assembly department, the customers began to question the quality of the cathode and gun in each unsuccessful or unsatisfactory picture tube. This led us to code each gun with the lot number of the cathode used in it and to record the lot numbers shipped to each customer.

Cathodes are not considered satisfactory at our plant unless they can be activated by a standard procedure. Still there are some variations which tend to make these cathodes process differently at the customer's plant. Lot numbers on each gun allowed the customer to process one lot at a time and allow for the lot characteristic in his process. Thereby our lotting system helps the customer use the gun more effectively. Where difficulty was encountered with a lot, we were in a position to investigate the performance of the lot in our plant and in the plant of other customers and render the customer a service in helping him trace down trouble in his procedure which he might otherwise believe was due to cathode failure.

Customers' interest in our procedures has led us to furnish detailed information of our control process and the data on individual cathode lots. Sonotone electron guns have been built into more than a million picture tubes and hundreds of cathode lots have been processed. Despite this volume and number of customers, we have been able to keep each customer regularly advised on cathode performance.

When a customer's first order is shipped we write him about our practice and enlist his aid in correlating our results with his. Our first letter states:

> "We have recently shipped you some Sonotone cathode ray guns. The cathode lot numbers included in this shipment are clearly marked on each mount. It is our practice, not only to closely control the thickness of the cathode spray coating by accurate and systematic quality control methods, but also to check samples of each cathode lot for its emissive properties before releasing the cathode lot to the plant for assembly.
> The enclosed graphs indicate the emission readings obtained from our tests of cathode ray guns, which were aged and activated according to our Process Specification 060,078, a copy of which is enclosed. The readings we obtain are an average of 5 samples run on a trolley exhaust system and processed according to PS060,078.
> We send each of our customers cards, similar to the enclosed, and ask that they return the cards filled in to show what the beam current, cut-off voltage and gas readings are. We have asked each customer to take a sample of 5 guns from each shipment or carton and send us the data on the enclosed card, since it gives us information which we can more closely correlate with our own results. This, in turn, permits us to give a better estimate of how future shipment will perform.
> Will you kindly return information on this, your first shipment, and also similar data on samples taken from future shipments. We shall be glad to furnish you with additional cards as your supply dwindles.
> We are sure that this information has been of value both to ourselves and to our customers in reducing the possibility of low emission mounts turning up in finished picture tubes."

We follow these regularly with graphs showing the emissive qualities of all cathode lots on a variables graph. The graphs show minimum acceptable values for the average emission of the sample.

Our system of reporting quality to the consumer has many similarities to those discussed by Mr. King.

a. Classification of defects:
   A specific critical characteristic is tested by a destructive test.

b. Use of recognized sampling plan:
   Control chart technique, variables inspection is used.

c. An acceptable quality level:
   Although a definite AQL is not specified, acceptable levels of emission are specified and the lot acceptance criteria are furnished the customer in the Process Specification.

d. A lotting plan adaptable to sampling technique:
   Each electron gun is marked with the lot number. Each lot is the result of a single manufacturing run.

e. Process average information in the producer's plant:
   Graphs are furnished to the customer showing the emission of each lot tested. Each graph may include 40 or 50 lots. Accepted and rejected lots are included.

Customers have as a rule not returned post-card data, although some quality-conscious organizations have cooperated splendidly. We ceased mailing data to customers for a short while, but requests were received asking that we resume the practice and we decided to do so. Unjustified complaints of cathode failures have not been a cause for product return since this program was introduced. This, of course, is primarily due to the quality of cathodes although the publication of the data has been of real assistance. Publication of the data and the lotting system has caused blame to be placed on the consumer's process, when it was at fault. Had the information not been available the electron guns might have been blamed for the poor performance and returned. Thus the lotting system and data aids the customer as well as Sonotone. The most valuable result we have obtained from our practice is customer confidence. This has fostered the growth of the operation.

We believe that certification has a definite value since it furnishes the customer information which is not obtainable except by an involved incoming material inspection procedure. This information assists Sonotone customers to do less incoming material inspection and still have

adequate knowledge of the product received.

The entire aim of vendor certification is a reduction of the incoming material inspection load without sacrifice of quality assurance. Good inspection practice can do some of this by using reduced sample sizes. An even greater saving can be realized if the incoming inspection service is alerted when process averages are marginal so that more rigorous inspection plans can be placed in operation to prevent sub-standard parts from passing to stock or to the assembly line. We believe that the plans discussed herein and by Mr. King implement this purpose.

We are firmly convinced that the organization that furnishes adequate quality reports on its product is doing a worth-while service to the customer. It is the intention of Sonotone to continue this service and to encourage our vendors* to furnish quality certifications of this type to us.

*"Narrowed Limit Gages," unpublished paper by Ellis R. Ott and August B. Mundel.

Quality Control of Visual Characteristics in Carpet Manufacture

S. E. LEZINSKI

Chief Inspector, Bigelow-Sanford Carpet Co.

ONE usually thinks of statistical quality control as applied to dimensional characteristics. There have been few statistical applications of those characteristics which cannot be measured. Most products are made to dimensional specifications and yet have appearance requirements. Such is the product of the carpet industry.

A recent Roper Survey made for our industry shows that color is the most prominent characteristic in the eyes of the consumer. Adherence to physical specifications is taken for granted. Furthermore, an analysis of customer complaints indicates that such characteristics as yarn defects, weave imperfections and finish characteristics, all of which affect the appearance, are cause for dissatisfaction. Therefore, a real need exists for some means of measuring these visual characteristics if we are ever going to know where to peg our quality level.

The method described here is not an accurate or fool-proof means but rather represents a workable approach.

Once carpet is woven, there is very little that can be done to improve its appearance. It is impossible to re-weave, although some repair work can be done. As a result, the carpet industry has two classifications for its product—perfect and mill seconds. Mill seconds carry a discount. The production cost is often more for mill seconds than for perfects because of the additional work required in effecting repairs. The discounts and additional production costs are enough to mean the difference between profit and loss.

Our problem of classification of carpet is to view it as does the average customer. The secret here is to conduct the inspection in the same mental sequence as the customer. The Roper Survey and the analysis of customer complaints showed that color, yarn, weave, and finish were the important characteristics. It so happens that these visual characteristics are a result of basic steps of manufacture. These are, in order of manufacture, dyeing, yarn making, weaving, and finish. This principle of relating visual defects to basic operations is fundamental. The basic classes of visual characteristics which we have developed to fit the needs for carpet are

A. Color—Uniformity or levelness
B. Yarn—Physical differences that are visible
C. Weave—Machine difficulties: carelessness in assembly
D. Finish—Pile lay, feel, backcoating, puckers, off-square —dressing up of the product.

Our next requirement is the attachment of a numerical value to each of the basic classes. Our objective is to keep the readily apparent visual defects from getting to the customer. On that basis we assign the highest values to the most outstanding defect in the basic classification. We have found that the normal range of opinion is in five steps. By that we mean if an individual were to try to describe the range of opinions of a quality product he would most likely say that the product is

Best: Complete absence of flaws. Exceptionally desirable.
Good: Will contain a few minor flaws which are not readily detectable and will not affect or harm the usefulness of the carpet. Still a very desirable product.
Satisfactory: Readily detectable flaws of a minor nature. No damage to end use. Satisfactory service or use can be expected.
Chance: Readily detectable flaws of a minor nature and even a major defect that the average customer *might not* accept.
Inferior: Contains major defects which cannot be repaired and must be rejected. No customer will accept.

We have merely assigned numbers to the degrees of opinions as follows:

0—Best
1—Good
2—Satisfactory
3—Chance
4—Inferior

Once this transition takes place, the whole idea of opinion rating of quality for visual defects takes on the numerical aspect.

In order to have each inspector use this plan with the same effectiveness, it had to be formalized. The new inspector needed a guide to follow and the experienced inspector needed such a guide in order to keep in line. To answer this need, we developed an inspector's guide for judging the basic classifications by listing all the visual defects possible for each of the basic classifications. In addition, a chart was made to indicate the possible degrees to

which each defect can occur. To explain, there are visual defects that cover the entire spread of five degrees—from complete absence through the irreparable. In this case, the guide would show all five possibilities. There are others which, if recognized at all, could not fall into the good or second class but would have to be serious enough to carry a value of 2 for satisfactory or 3 for chance. In this case, the good degree would be crossed out in the inspector's guide. Some defects are easily visible and, therefore, if they exist at all, place the product in at least the 3 or chance category. Others are so glaringly noticeable that they are of a major nature which would call for a 4, or rejection.

An example of the inspector's guide for judging yarn is shown in Fig. 1.

A check inspector is well versed in the manufacture of carpets, having spent considerable time with the various operations which produce the finished product. This means he is adept at identifying the many types of defects which can occur, together with their probable origin.

He accepts for check inspection about 40 percent of the rolls of carpet which have previously been graded and classified by the production inspectors. These inspectors look at 100 percent of the carpet rolls, make minor repairs, call for others to be done by the Finishing Department, decide what defects should be cut out and, finally, classify the rolls as perfect or mill second.

In accordance with the inspector's guide, the check inspector notes his ratings on the "Inspector's Daily Report" (Fig. 2) on which appear the roll identification and the ratings as to color, yarn, weave and finish. In addition, any reason for low ratings may be entered as he sees fit: The summary line of the Daily Report gives the average rating values for the four characteristics, together with sum of these four averages, which appears as the quality level for that day.

Periodically, the detailed data available in the Daily Report are summarized by grades of carpet on a "Summary Sheet" shown in Fig. 3. We thus obtain, for periodic comparison, information as to the grades of carpet check-inspected, the number of rolls, the average value for each of the four characteristics and the quality level of each grade. The data gain further usefulness in that a weighted average for all the grades

INSPECTOR'S GUIDE FOR JUDGING YARN

CHARACTERISTICS	0 BEST	1 GOOD	2 SATIS.	3 CHANCE	4 INFERIOR
Mixed Yarn		X	X		
Hard & Slack Twist		X			
Heavy & Light Ends					
Contamination					
Wrong Ply		X	X		
Oily Ends					
Non-Permaset		X	X	X	

Figure 1

INSPECTOR'S DAILY REPORT

GRADE OF CARPET	ROLL NO.	COLOR		YARN		WEAVE		FINISH	
		RATE	REASON	RATE	REASON	RATE	REASON	RATE	REASON
A	1492	0		1		0		0	
A	1776	2	Streaks	1		1		0	
B	1865	0		3	Heavy Ends	4	Low Rows	1	
C	1812	4	Wrong Col.	2	Cotton	2	Hook Mks.	0	
D	1918	1		0		0		1	
A	1929	3	Streaks	1		3	Bad Start	2	Coating Skips
SUMMARY		1.67		1.33		1.67		.67	

QUALITY LEVEL—5.34

Figure 2

for the four characteristics is computed and an overall quality level obtained.

This method of evaluating visual characteristics was started in January, 1950. To keep informed as to our findings, we summarized the check-inspection findings each week and plotted the weekly quality level on a trend chart. During January and February the quality level showed normal variation from week to week; however, in March we noticed from the plottings that the quality level had taken on a decided turn for the worse. An analysis of the weekly records showed that during the first two months the check inspectors were looking at about 40 percent of the mill seconds or bad rolls of carpet. However, in March they were looking at a greater percent of mill seconds and thus had caused a general lowering of the apparent quality level. This was practicing biased sampling.

To overcome this, a set of random sampling plans was devised which the check inspector could follow in making his selection of rolls. It was found that he could easily evaluate 25 rolls during an eight-hour shift and several plans were designed on this basis. There are seven inspection alleys in each of which one roll of carpet is rolled out at a time.

The production inspectors ordinarily inspect one roll of carpet an hour per alley. Thus, 56 rolls of carpet are 100-percent inspected during a shift. Numbering the alley-hours from one to 56 and using a set of random numbers (logarithm tables), several plans were devised, one of which is shown in Fig. 4. Thus, referring to the sampling table, during the first hour of the shift, the check inspector will evaluate the rolls of carpet in alleys 2, 3, 4, 5 and 7. During the second hour he will evaluate the rolls which are now in alleys 1, 2, 4, 5 and 6. Finally, at the eighth hour he will look only at that roll of carpet in alley 6. The next day he follows a different sampling table that is given to him by his supervisor.

It will be noted in this particular plan that some hours demand as many as five rolls to be inspected, while others have as few as one.* However, this levels out as there is some overlapping in actual practice. It may be well to point out that the check inspector evaluates the roll at

*To overcome the objection of uneven hour-to-hour work load, it may be more satisfactory to randomize with the restriction that there be three samplings per hour.

the same time it is being inspected by the production people. For further clarification as to the randomness of this sampling, the rolls of carpet, as they are rolled out in the alleys, approach closely the chronological order of manufacture but are presented to the alleys on a chance basis as to the loom from which they were produced.

One of the problems involved in any form of inspection is that which relates to the proper use of the tools of inspection. In this plan it is necessary that we determine periodically whether the different check inspectors are using the arbitrary scale in the same way. We desired to find out how well our inspectors could repeat themselves and thereby determine the validity of the check inspection results. The question of repeatability concerns itself with those factors which contribute most heavily to variations in measurement, namely:

1. Variation within check inspectors
2. Variation between check inspectors
3. Variation between shifts (day vs. night)

Our method here was to take ten rolls of assorted grades of carpet and have two check inspectors evaluate them at four different times, each approximately a week apart. They were reviewed twice under daylight conditions and twice under night (fluorescent) light.

Using the "Student t" for paired grouping, we found at the 5-percent significance level†

1. Judgment of each check inspector on repeated ratings is consistent.
2. As to variation between check inspectors, we found a significant difference in the weave category. Here a basic misunderstanding as to classification of defect and degree of seriousness existed; however, a close study of the test data brought the condition under question to light and it was quickly remedied.
3. There is a significant difference in results between daylight and night-light inspection in all categories but yarn. Yarn is the most physically measurable of the four characteristics and, therefore, the most consistent. This points out the need for standardizing the lighting conditions under which the carpet is inspected. This is a large undertaking. It involves a large group of considerations as to what is standard. However, experiments have cleared some areas of considerations. More time is needed before this phase is completely cleared.

All of the surveys and checks on this system so far have given us assurance that we are doing something constructive. We are gathering and dispensing information which allows those truly responsible for quality—the production people—to concentrate their efforts in those areas where weaknesses become quickly evident under this plan.

The real test for any plan is how much have the actual imperfects decreased. In 1951 the total mill imperfects hit a new low in that there was a decline of imperfects of 18 percent over 1950. In addition, since 1948, the base year, the imperfect percentage has been cut in half. This good record is the result of many factors along with our system of visual inspection. It is the measure of the effectiveness of the combined production departments and quality control efforts.

Though perhaps the most important, the reduction in mill seconds is just one of many good reasons for the institution of a check inspection. Enumerating these reasons, they might be as follows:

1. The Check Inspection serves as an audit of the production inspectors. This serves a most important function in helping to prevent defects from reaching the field. In this respect, it is useful to detect changes in visual inspection standards as they occur so that a decision may be reached *before* there is a flood of complaints from the field. Any differences between inspectors may be spotted and steps taken to resolve them.

2. A single index of quality, referred to as the "Quality Level," is

SUMMARY SHEET

GRADE	NO. ROLLS	COLOR	YARN	WEAVE	FINISH	QUALITY LEVEL
A	200	.25	1.25	1.25	.50	3.25
B	80	.00	.00	1.65	.50	2.15
C	30	.10	1.40	1.10	.20	2.80
D	100	.25	2.25	1.75	.25	4.50
E	50	.06	.30	.30	1.50	2.16
F	40	1.00	1.50	.00	.00	2.50
Weighted Average	500	.24	1.18	1.21	.49	3.13

Figure 3

SAMPLE TABLE—A

HOUR	ALLEY NUMBER						
	1	2	3	4	5	6	7
1ST		X	X	X	X		X
2ND	X	X		X	X	X	
3RD							X
4TH	X			X	X	X	X
5TH				X			
6TH	X			X	X	X	
7TH				X	X		
8TH						X	

Figure 4

†H. A. Freeman, "Industrial Statistics," John Wiley and Sons, Inc., New York, 1942, pp. 8-15.

obtained for each Weave Shop. This tells a good deal more about the quality performance than the percent of imperfects because it answers the question "How good is our perfect production?" It allows valid comparisons within and between the shops, as well as the establishment of a quality standard against which to compare quality performance. Overall quality trends (in both directions) may be noted and commendation given where deserved.

3. Comparable indices are developed for each individual grade of carpet. Thus, the normal quality characteristic is established for all fabrics (and they do vary) as they come into the line. This is a valuable guide in predicting what kind of quality difficulties are to be expected in the production of a new kind of carpet. And again, quality trends for the various grades are noted and an explanation found.

4. Tying in with the functional manufacturing department—color (Dye House), yarn (Yarn Mill), weave (Weave Shop) and finish (Finishing Room)—quality levels for these visual characteristics give valuable information as to the quality performance of these manufacturing sections. In many ways, it is a truer gage than any formerly used, as it relates the performance of a given section to the quality of the end products.

5. Top management is vitally interested in the quality of outgoing product. Responsible for setting quality policies, they are constantly aware of the quality-cost relationship and must have the facts relating to quality levels in order to make those decisions. The Check Inspection plan gives just such an index. When a change in quality level occurs, it can be easily noted. By the same token, when the need for a change in quality level is indicated by market conditions, or competitors' quality, management has the information required whereby to specify the change. Furthermore, there is the assurance that the change has taken place, as specified.

6. The Quality Control Department is the agency through which complaints are handled. The classification of a complaint as either justified or unjustified involves some evaluation of the piece of goods as it left the mill. In the past, only an approximation of this could be obtained, as the records would show simply "perfect" or "mill second." It is now possible to obtain a detailed description of the roll if it happens to be one which has been check inspected. If it was not check inspected, it is likely that some rolls from the same loom of the same lot of yarn would have been check inspected. The general pattern will usually unfold and will be sufficient to allow reliable judgment. This has resulted in reducing the number of claims as well as improving the effectiveness in handling those which are received.

7. Perhaps one of the most important services rendered by this program is that of obtaining more consistent results from inspection through a systematic approach in judging the carpet. Because the meaning of each rating is fairly clearly defined, the "grey areas" of disagreement are few.

8. An interesting and useful by-product of this program is the reduction in the time required to train an inspector. It was formerly thought necessary to have from six to ten years experience to acquire the requisite skill and knowledge to become a qualified inspector. Having thus formalized and standardized the inspection, it now can be done in six months. Not only does it require less time to train an inspector, but also the inspector is much better equipped to assume the duties of the job. Little is left to chance; every quality aspect is reviewed. This is using the positive rather than the negative approach, for instead of looking for what is wrong, the inspector is taught to look at every aspect and grade for the good as well as the sub-standard. As a result, the inspector has more confidence in his judgment, and he knows that he will be backed up in case of any question.

9. In order to know how our quality stacks up with that of our competitors in the mind of the customer, we must have a yardstick against which to compare both products. This technique of inspection and control of visual characteristics by the use of opinions offers just such a yardstick. From time to time field trips are made and competitive products are rated one against the other. The results when compared provide impartial comparisons upon which future plans may be based.

10. It would be poor quality control taste were we to omit mention of the most obvious advantage from the theoretical point of view. For although it has been touched upon in the preceding paragraphs, it must be spelled out and clarified. This represents the transition from attributes to variables inspection. Not only does it answer the question, "Is it good?" but also it tells just how good it is, and why! Here is a dial indicator to replace the old go-no go plug gage on the final inspection of carpets. That variables inspection yields more quality information than inspection by attributes is well established, and no more need be said in this regard.

In summary, here is a refined technique for handling quality problems relating to products which are manufactured to physical specifications and sold on the basis of visual characteristics. The working details have been described, and the more obvious advantages enumerated. Though not entirely perfected, it is of great value in aiding in the control of the appearance of a product by means of opinions.

NOTICE

The Aircraft Committee of ASQC has been authorized to proceed with plans to publish an Aircraft Technical Report.

This report will be available for distribution in November. It will not be given Society-wide distribution as was done with the Textile Technical Suplement last year, but ASQC members in good standing may secure a free copy on request. If you want your copy of this report, send your request prior to Sept. 1, 1953 to:

American Society for Quality Control
Room 5736
70 East 45th Street
New York 17, New York

The Operator Is Interested*

J. FREDERICK VERIGAN
Atlas Powder Company

THE problem of interesting the production operator in quality control is an essential one. Personally, I know of no subject which should stand higher in the agenda of "musts" for the quality control engineer. The literature abounds with discussions of statistical techniques applied to the field of quality control, and the newly appointed quality control engineer can find many articles dealing with this phase of his work. Literature warning him of the importance of securing the operator's interest, and giving him some suggestions to help secure it, is much less abundant.

The importance of this problem cannot be stressed too much. In my own experience and in the experience of many of my colleagues in this field, we have seen many quality control programs either fail to get started or grind to a stand-still. This was not due to any lack of technical knowledge on the part of the quality control engineer but was due to the fact that, for some reason or other, the operator's interest and cooperation in the program was not obtained. This has been well pointed out in reference 3. In many cases no effort was made to arouse their interest, while in other cases the efforts made did not achieve the desired end. Make no mistake about it, the operator himself can "foul up" the best prepared program, if for some reason he is not in sympathy with it. I have never seen a program or system that, given a little time, the operator could not beat if he is so minded. It then appears essential that, by some means, we establish the operator on our side of the fence. It is the purpose of this article to try to accumulate and discuss some of the methods which some of my friends and I have found to be successful in obtaining the interest of the operator.

Before discussing ways and means of interesting the operator, perhaps we should take a few minutes to look at the operator himself. I would like to restate the subject, "The Operator Is Interested," as a statement of fact. I believe the operator *is* interested—in quality control or any other method which will improve his standing, financially or otherwise. Therefore, our problem is to so point all our methods that they emphasize this aspect.

Much has been said about the modern operator being interested only in the number of pieces produced and that his pride in quality workmanship is gone. I do not subscribe totally to this viewpoint. While some operators may be interested only in the pay check (and quality control can be of interest in this way too), I do not think this is true of the majority of machine operators. Perhaps we have "missed" the boat" by assuming that this was true of all operators. Pride of a job well done is not confined to any level of achievement, and you will find just as many machine operators who have a high degree of pride in their workmanship as you will in any other industrial class. The methods of interesting the operator which emphasize pride of quality workmanship will produce results with this group, and to this group of operators quality control has a lot to offer. Its methods enable management to recognize those operators producing high quality and to reward them with better positions, etc.

The other group, those operators who are interested only in the pay check, can also be definitely interested. Admittedly, it may require more effort and ingenuity, but it can be done. Quality control does result in machine downtime being reduced. This means more pieces produced, thus more money for the operator in those plants which are operated on an incentive basis. If the operators you are dealing with fall into this category, there are also some techniques for interesting them.

Both of these groups may display a disinterested attitude at first because they are suspicious of anything they don't understand. Unfortunately, they have also been led to believe by some misguided leaders that all new tools of management are restrictive in nature and have as their goal a reduction in the pay check. Only by patient and well-planned programs can these suspicions be allayed. Once this is done, however, I believe you will find that the operator *is* interested in quality control.

It may be that I am mistaken, but I believe all methods of interesting operators need to be directed to

1. Overcome the suspicions of new management tools
2. Appeal to the operator's pride in producing quality product
3. Convince the individual who is only interested in the pay check that quality control can also benefit him.

Keeping these aims in mind, let us look into some methods which have been successfully used to arouse operators' interest and to obtain their active cooperation in quality control programs. These ideas are not discussed necessarily in their order of importance. Likewise, it is not claimed that this list, by any means, includes all such methods. It should be realized, of course, that what works in some plants may not work in others. It is hoped that these thoughts will be of assistance in their present form but, above all, that they will stimulate thinking and discussion on this sub-

UNION INFLUENCE

It is true that in many plants operators form their opinion of new management tools from the attitude of union officials toward these tools. It is imperative, then, that every means be taken to see that the union officials are advised of the aims of the program and its effect upon the individual operator. It is necessary that they understand the way the program will be organized and administered so that they can answer the inevitable questions of their constituents. The better the union officials are informed concerning your program, the more influence they can wield for you. Make no mistake. If this step attains the desired results, the odds in favor of the success of your program are greatly increased.

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As a starting point, a meeting can be held at which the officers of the union, the officials of the company, and the quality control engineer are present. At such a meeting, it is good practice to have the company officials explain the need of quality control, its effect upon job security, the company's plans for administration in detail, how the quality control engineers or inspectors will function, their responsibility, etc. The quality control engineer should explain in simple terms, and I emphasize *simple* terms, the basic principles of quality control, etc. At a meeting of this sort, the union representatives should be encouraged to ask questions. Every effort should be made to win them as active partners in the venture.

At one such meeting at which I was present, the union president asked if we would prepare a short article, for distribution to his stewards, that would explain the program. We prepared a one-page article which was distributed and which permitted the stewards to answer successfully the questions the constituents asked of them. At this plant, moves such as this assured the union of our sincerity and we did gain their active cooperation. Whenever this hurdle can be successfully overcome, the program is off to a good start.

PERSONAL TALK WITH THE OPERATORS

I know of no method which will produce such satisfying and lasting results as a personal talk with the operator or operators in whose area the program is to be started. The attitude of the quality control engineer should be friendly and on a common basis, not one of condescension. The aims and purposes of the program should be explained in very simple terms, being careful to keep the emphasis on the benefits which the program will give to the operator individually.

I want to emphasize keeping the language simple and in shop talk. Do not try to impress the operator with your knowledge of statistics by high sounding technical language. Emphasize that control charts measure the process, its variability and level, etc. and that you are interested primarily in quality.

For some reason, many operators associate these techniques with time-study. You all know what operators think of time-study, so do all you can to change this concept. In these contacts, do all you can to sell yourself personally. The more the operator is convinced of your fairness, honesty and sincerity, the more he will think of the program you are starting. Be patient, going over the details of the program which affect the operator until you are sure he has gotten the points you are trying to establish.

Once you have explained the purposes and benefits of the program, ask his opinion on the particular operation involved. Each machine operator knows considerably more concerning the eccentricities of his machine or operation than you do. He has definite ideas as to what the sources of trouble are, and how he would correct them. Listen carefully and with an open mind! In my experience, these talks can supply you with a gold mine of information on assignable causes of trouble.

Don't sell any of these operators' ideas short! Prove your sincerity by getting these ideas tried. Demonstrate to the operator that the use of control charts will either prove or disprove the worth of an idea. If any of the ideas are worthy, see that the operator gets credit.

If you go about these personal contacts in the right manner, you will have established yourself and your program with this one operator or group of operators. This being accomplished, there will be no better testimonial for your program than from these well-satisfied operators. They will make the expanding of your program easy.

I personally know of one program where, on the initial installation, at least two troublesome sources of variation were disclosed to quality control engineers by the operators during these personal talks. The removal of these causes saved many dollars and made possible the production of a high quality item.

MAKE THE OPERTOR A PARTNER

Most of the machine operators I have met are intelligent persons with at least the average amount of curiosity. They would like to be an active participant in any new project and they will usually respond if they are invited to take part in your program. For one reason, it makes them seem to be just a little more on the inside of this new venture than the other operators.

It is not difficult to teach an operator to make the necessary calculations and plot values on a control chart. Take the time to teach him, and ask him to maintain the chart for you. As the points progress across the chart, interpret the chart for him in simple language, point out how the chart responds to tool wear, tool adjustments, changes in stock, etc. Unless he is different than the majority, you will have a very interested partner in your program, ere a few days have passed, and he will have a great influence over the balance of the operators in the department.

As an illustration of what can result from this approach, I should like to recount a recent experience. It had been decided to apply statistical quality control to a branch plant which produced screw machine parts. We decided to select carefully two machines and seek the cooperation of the two operators on each shift. They were taken to the superintendent's office where the engineer explained the purpose of quality control, what we hoped to gain at this plant, and gave a little idea of how it worked. The superintendent emphasized that these men had been hand-picked because of their acceptance of progressive ideas, pride in their work and good spirit of cooperation. They agreed to become partners in the program. They were given ten hours of instruction in the mechanics of constructing and maintaining a chart. The charts were started. At this point we agreed we would let these charts run for a month to obtain the reaction of the remainder of the employees before expanding, and so I returned to the main plant.

The next week as I made a visit to the branch plant, imagine my surprise to find several dozen control charts on machines. Upon questioning, I found that other operators had been so curious as to the control charts, and so anxious that the two selected operators should not get ahead of them, that they had requested the two selected operators to instruct them how to make a chart. There were many mistakes, of course, but, because of the competitive spirit of these operators, we were forced to take the entire force in groups of 20 and teach them to maintain control charts. The entire shop was placed under quality control six months earlier than we calculated in our most optimistic estimate.

Perhaps this is one of those things that happens only once in each quality control man's life. I do believe it

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shows what can happen by the careful selection of the operator and by taking him in as an active partner in the program.

IMPROVED GAGING METHODS

In addition to improved gaging methods being a requirement for statistical quality control, it is also a means of interesting the operator. He realizes that better equipment permits him to produce quality parts with more assurance. He is usually interested from a personal standpoint in having the latest type of equipment to work with. When the new gage is placed into operation at the machine, the quality control engineer should take that opportunity to describe its benefits to the operator. In most cases it will be some type of direct reading gage replacing a go-no go type. It is not difficult for the operator to see that this new gage gives him better control of his product, saves tool grinds, and provides many other benefits. The quality control engineer should impress all these points upon the operator.

There is another real result from this method. It is a tangible proof that management is sincerely behind the quality control program. The operator is quick to realize when management is only "talking" quality control and when they really mean business. If he can see by action that management is solidly behind the work, he will tend to be more impressed with the program.

CORRECTING EQUIPMENT

Following close on the heels of the last mentioned technique is one which will really interest operators in the program and will tend to keep them interested. This method is the repair of machines where indicated, and buying new equipment and tools where the old ones are not adequate to produce parts to specifications.

Each machine operator, worthy of the name, develops a great interest in his particular machine. He learns its peculiarities. He knows its capabilities. He generally knows what should be done in order to repair the machine so as to reduce variation. He knows what type of tools he should have to do certain jobs. It has been my experience that these matters are quite often brought to the attention of the foreman who treats them merely as an alibi and promptly dismisses them. It is difficult to convince an operator who has had this experience that management is honestly interested in improving quality.

When the control chart reveals a machine to have excessive variation, and the investigation reveals the need of corrective action, such as repair of machine, new tooling, etc., the operator watches with interest. If you make the necessary repairs or purchase new tooling, you will have convinced the operator that management is squarely behind your program. He will be convinced that the quality control program can get things done and you will have aroused his desire to be a part of such a program.

If management ignores the requests to correct equipment when it is shown to be necessary, it becomes very difficult to sustain interest on the part of the operator.

SUPERVISOR TO SHOW INTEREST

It is generally agreed that most operators are interested in that in which their supervisors are really interested. So we might say that one way of interesting the operator is to first interest his supervisor. Not all supervisors are interested; in fact, they are often the real stumbling block. The supervisor can harm the program by ridiculing it behind the back of the quality control engineer. The operator quickly notices this and is not really interested in it thereafter.

The passive interest of the supervisor is not enough. He must show an active interest in the program. For example, if there are control charts on a machine, and days go by without the supervisor looking at them, it is hard to convince an operator that his boss is really interested. Therefore, the operator will quickly lose interest. Conversely, if the supervisor makes it a point to look at each chart and discuss it with the operator, questioning this point and that trend, the operator becomes convinced of his boss' interest and he too will become interested. One plant has solved this problem by requiring that the supervisor actually select one sample per day from each machine in his area, calculate and plot values on the chart and initial this point. Thus the employee's interest is being sustained because of the supervisor's active interest.

However, since this article is directed to interesting the operator, we will leave the supervisor to someone else. We will assume that the proper parties have obtained his interest. Since the supervisory group is unusually small, a few meetings will ordinarily suffice to cover the plant as far as supervisors are concerned.

PUBLICITY PROGRAM

Perhaps one of the most widely used methods to arouse and maintain operator interest is some form of publicity to inform entire plant personnel of quality control programs. These publicity programs take many forms and may include one or more of the following ideas.

House Organ. Many companies have either a paper or magazine which is periodically distributed to all employees. This medium is an excellent channel to place before the entire personnel articles designed to gain interest for quality control. An article concerning a simple explanation of what quality control is, how it works, and what its benefits are as pertaining to the specific company involved, is usually written to appear about the time the program starts. In this article, the personalities involved in the program are introduced, pictures are shown of operators concerned, etc. All this is designed not only to introduce the program, but also to gain the individual operator's interest by publicly identifying him with the program.

To sustain interest, case histories are published from time to time in these same periodicals to show the results of quality control. A part of these articles should always be devoted to building up the operator's part in the achievement and, wherever possible, using a picture. Most folks like to see themselves in print.

Posters. Attractive posters, strategically located throughout the plant are a means of awakening and sustaining interest. The posters should be located where they can be easily seen. They should be changed often so that the employees do not become accustomed to seeing the same poster for long periods of time. They should be on a special bulletin board, if possible, so that they are not lost in the usual disarray of old bulletins, etc., that seem to be a part of most bulletin boards.

The posters should be well drawn and should be colorful. If you are fortunate enough to have an art staff, it may be possible to have posters made whose message is directed to specific problems in spe-

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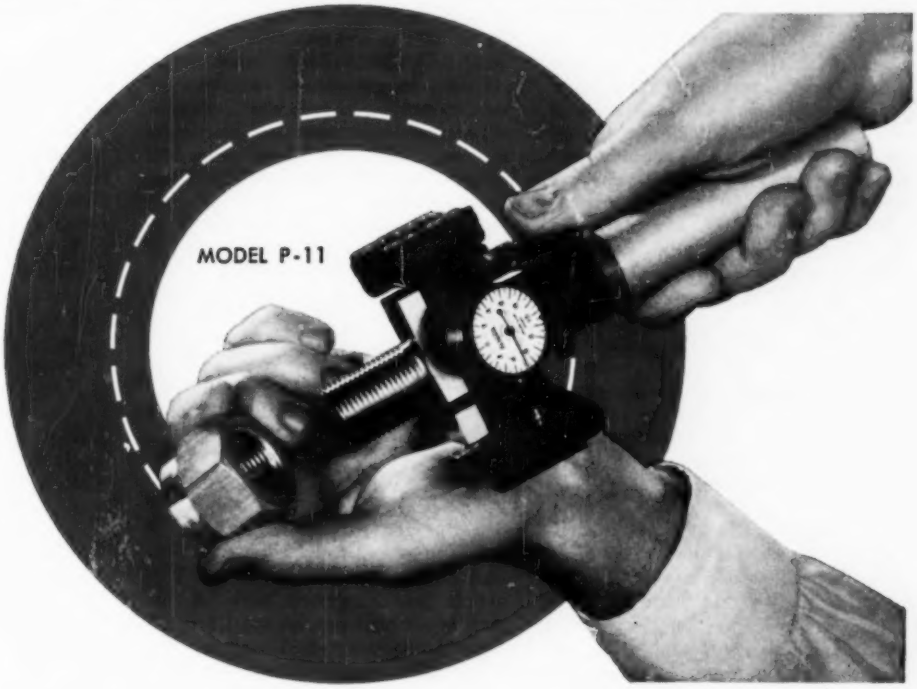

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cific locations. Failing this, the poster services of certain well-known management services do a very excellent job.

Scrap Displays. Another very effective publicity method to use in interesting operators is that of displays of parts scrapped by their operation. Several companies have built display counters in prominent locations in each department. On these counters, the accumulated scrap parts for a period of time are placed. The dollar value of these parts is also shown alongside the display. This idea can be built into a very elaborate affair, depending upon the results obtainable from it.

It has proven to be a most effective means for awakening operator's interest and as well as for reducing scrap. I believe that few operators actually realize the dollar value of the parts which may be scrapped because their operation is below standard. When this is visibly and forcibly brought to their attention by a display of this nature, the results almost always have been good.

Another variation is a large chart which will show the dollar value of scrap produced by the department each day. This chart should be very large so that the movement of the points can be easily read from a distance. This chart should be mounted in a conspicious place. In one company of my knowledge, such a chart is mounted over the time clock alley. It has been very effective in reducing the scrap in that particular plant.

CONTESTS

There have been many companies which have instituted various types of contests in connection with quality control programs. Some require creating a slogan, some choosing a quality control queen, as well as various other ideas. The purpose, of course, is to arouse employee interest. The fact that so many companies have used this method must mean that it achieves results. It is necessary, of course, to have worthwhile prizes, and to provide adequate publicity to sustain interest in the contest over the required length of time.

One contest which is very much to the point, is one in which the departments are judged by the improvement in their quality noted over a period of time.

CONCLUSION

The degree to which the operator is interested in the quality control program will govern to a large extent the success of the program. This article has suggested some of the methods which can be used for obtaining this interest. There are undoubtedly many other methods which can be tried with equal success. Every quality control engineer will have his own approach to the problem of interesting the operator.

The question of operator interest is especially important to the quality control engineer who is just installing a program, particularly when he has not had experience in dealing with this problem. A paper, or series of papers which would set forth as many ideas as possible so that they can all be weighed would be of great service to all quality control engineers. It is my earnest wish that my colleagues will aid all of us by presenting more thorough discussions of this subject than has been done here.

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REPORT OF THE

Seventh Annual Convention American Society for Quality Control

Philadelphia, Pennsylvania, May 27-29, 1953

Unofficial figures indicate that 2567 persons attended the technical and educational sessions and another 772 viewed the 44 industrial exhibits. These figures made the Seventh Annual ASQC Convention the largest of all previous conventions. The Seventh had more people, more exhibitors and more speakers than any previous convention.

A large audience of visitors, officials, members and exhibitors were welcomed to the city by Philadelphia's Man of the Year, Frank N. Piasecki, 34 year old Chairman of the Board of Directors of the Piasecki Helicopter Corporation, Morton, Pa. Mr. Piasecki was introduced to the Opening Assembly by Simon Collier, President of ASQC., after the assembly had been called to order by William Masser, general chairman of the Seventh Annual ASQC Convention.

Mr. Piasecki spoke on the necessity for maintaining world technological leadership. He pointed out that we are currently being hardpressed to maintain this leadership and also stressed the fact that statistical quality control is an important reason why we have been and can continue to be leaders in world technology.

The delegates began arriving as early as Tuesday evening with many of the early arrivals spending their evening discussing quality control and other subjects in the Crystal Ball Room of the Benjamin Franklin hotel. Others hunted up shows, movies, or other entertainment.

The six participating hotels found rooms for those not able to make advance registrations. Pre-convention parties and gatherings kept many

delegates up late Tuesday evening and accounted for the rush at the Registration Desks at 10:30 Wednesday morning.

Transportation facilities from the hotels to Convention Hall were provided by special buses of the Philadelphia Transportation Company. All these facilities, good times, and friendly atmosphere started the convention off on a good footing and virtually assured its success before it began.

SOCIAL EVENING

The social evening was certainly an auspicious event. It gave everyone an opportunity to either make new acquaintances or renew old ones. The conviviality of the evening was by far the best way to start the convention since it engendered good fellowship and certainly helped to stimulate subsequent interest in the convention activities. The door prizes were contributed by various local industries.

EDUCATIONAL SERIES

The Advanced Educational Series was presented under the direction of Prof. Irving S. Hoffer, Temple University, Philadelphia. He was assisted by E. C. Harrington, Jr., manager of industrial statistics, Monsanto Chemical Company, Springfield, Mass., who introduced the series with a discussion of sampling variation and variance ratio tests. After the first session on Wednesday, Norman Garner, analytical statistician, Quality Assurance Office of the Philadelphia Quartermaster Depot, continued the advanced course on Thursday morning by discussing sampling variation of averages, Student's "t" test, sample size and the power of a test.

Thursday afternoon and Friday morning, Dr. Martin A. Brumbaugh, director of statistics, Bristol Laboratories, Syracuse, N. Y., and Mr. D. B. DeLury, Director, Department of Mathematical Statistics, Ontario Research Foundation, Toronto, Canada, combined their skill to present and discuss designs of experiments, randomized blocks, Latin squares, one, two, three and four-factor design and analysis of variance, as well as confounding and fractional replication. Finally, Miss Bessie B. Day, principal statistician, F. R. DelPriore and E. Sax, statisticians, all from the U. S. Naval Engineering Experimental Station, Annapolis, Maryland, discussed on Friday afternoon, correlation and regression, linear and curvilinear, as well as multiple regression.

The first advanced course offered at the Seventh Annual ASQC Convention wound up as a complete success with a total of 170 "students" attending.

LUNCHEON SESSIONS

The three luncheons of the 7th Annual Convention were catered by McAllister and were limited only by the available space. This permitted some 1900 seats on the main floor of the Convention Hall, practically all of which were used during all three luncheons.

The Wednesday and Friday luncheons were intentionally kept pretty informal with the post-luncheon formalities restricted simply to introducing the people at the Speakers' table and to making brief announcements about the convention. An interesting sidelight at the Friday luncheon was an informal show of hands which indicated a gratifyingly large (roughly a third) proportion of visitors—people who constitute the sizable group of potential members.

On Thursday after the introduction of the people at the Speakers' table Dr. Ellis Ott, Rutgers University, presented a brief but very interesting report on the results of the Indian trip taken by himself and four other members of the United Nations Educational Team last fall. The following is the text of this talk which was also presented by Dr. Ott over radio station WAAT on Apr. 4, 1953.

At the request of the Government of India, a team of four of us went to India under the sponsorship of the Technical Assistance Administration of the United Nations. We went in September, 1952, and returned in January, 1953.

There are three programs which provide technical assistance to countries which qualify—and which ask for them. Besides the UN TAA program, the United States has the Point Four program and the Mutual Security Administration, related to NATO. India asked the UN to send a team to help them advance their applications of statistical analysis and quality control to their research and industries.

Our UN team members were Dr. Mason E. Wescott, Professor of Applied Statistics at Rutgers; Professor Paul C. Clifford, Montclair State Teachers College; Professor Anders Hald, University of Copenhagen, Denmark; and Thomas A. Budne, USA, Executive Secretary of the team.

Frankly, we didn't know whether India was ready for a program of applied statistics or not. We knew of their skill in hand-carving in ivory, wood and brass—beautiful, intricate work requiring almost infinite patience. But we knew little of any modern or semi-modern Indian industries comparable to those in which we team members had experience in applying our research and production techniques. But when we got to India, we found more modern industry than we had ever expected to find. However, it is not nearly enough to raise Indian standards of living as fast as she wants. There was very little development under the British during their 300-year occupancy either of their industries or leaders. An exception is their development of many large cotton-textile mills and jute mills.

Our team spent a month each in four of India's industrial centers. Calcutta is India's most diversified industrial center. It is a city of four million people—with modern machine shops, foundries, assembly plants—important manufacturing of chemicals, pharmaceuticals, and plywood—and is the jute weaving center of the world. But India is primarily agricultural and is not a great industrial country as yet—there is much more diversity, however, than we team members had expected to find there.

The Indian government plans to improve conditions, and has developed, under Nehru's leadership, the details of a Five-Year Plan (which comprises a large book) for the development of their industrial, agricultural, and social needs. There are many factors important to consider when we think of India's plans for the future and her possibilities of accomplishing them.

India's population is one-fifth of the entire world—twice the population of the United States—in an area half the size. It is 2500 miles from the tribespeople of the Himalayas in the north to the cultured people of South India. Over 200 language-dialects are spoken. Of these four are spoken by large groups of Indians, no one group of which can understand another. English is taught in all the schools to most of those who attend beyond the first few grades. English and Hindi are the official languages in the Indian Parliament.

Means of communication are in no sense comparable to those here in the United States—only in two of their principal cities, Delhi and Bombay, did we find a telephone system which we would consider adequate. We lived in modern, European-type hotels with every modern convenience except telephones. There are very few radios in India, and little chance of getting many more. There is only one small radio assembly plant in all of India.

There are good schools and colleges—with liberal arts and technical programs. However, the training is academic, and even the technically-trained students—students who must become their industrial leaders—have little concept of how to apply their theory.

Scene of continuous activity was the ASQC Book Booth. Indentifiable on the left are Edward C. Varnum, Chairman of the Rock River Valley Section talking with Prof. Eugene L. Grant, Stanford University.

The first general interest session—What Is the Quality Control Job?—moderated by J. M. Juran. Panel members were A. Oladko, Johnson & Johnson; A. V. Feigenbaum, General Electric Co.; H. E. Thompson, Anaconda Wire & Cable Co.; and W. H. Smith, Ford Motor Co.

India has many difficulties to overcome: scarcity of machines, of raw materials, of credit balance. She must develop many industrial and social leaders —more than can be developed in one generation. However there are many factors which permit us to be optimistic about her chances for success. We were very much impressed by Prime Minister Nehru. He impressed us as being imaginative, progressive, and a real leader. But India has far too few leaders. This is understandable, since it has been only five years that she has been an independent country with any real opportunity to develop them.

We saw industries which have been developing rapidly, and India is encouraging foreign capital to speed her expansion of them. Then there is another type of cooperative program which can help her development. One such was set up by 19 different private textile-mills in the textile center of Ahmedabad—the Ahmedabad Textiles Industries Research Association which does both basic and industrial research for their great textile industry. Similar programs which increase the service from her limited number of scientists include the Jute Research Institute, the National Physical Laboratory, and the Indian Standards Institute.

The government of India invited our UN team on SQC as one step in her program to develop industry.

The methods of quality control provide four important effects:

(a) Important reductions in scrap and rework
(b) substantial savings of scarce material
(c) increased production from existing machines and materials
(d) improved results from research and experimentation

These are the reasons that quality control is so important here in the United States where the applications of science have been developed during these last ten years. India considers them to be equally important in her economy. She cannot afford to use her short dollar-credit to import new machines and tools; she must get maximum efficiency from her existing facilities.

Notices had been sent to industries about the UN program. The response was many times as large as could be accepted. The majority of the trainees were college graduates representing both private industries and different divisions of the Indian government.

Our first training center was in New Delhi, the capital of India. We conducted there the first of our four training programs for 40 representatives of industry and government.

There were three different aspects to each of our programs:

1. The training of representatives of private industry and the government in the techniques and practical applications of quality control. We used the same methods of training that we have been using here at Rutgers for the last five years.

2. The training of potential Indian leaders and teachers of quality control —in methods of teaching and in advanced application.

3. Discussions with representatives of management of Indian industries about basic principles and policies for establishing effective programs of quality control in their plants.

After this first center in New Delhi, we had similar training programs of three weeks each in Calcutta, Madras, and Bombay.

Before we left India, we had concrete evidence that these methods of SQC could be applied by them to their industrial problems. In one startling example in Calcutta, a pair of trainees coupled engineering knowledge with their new methods of SQC to reduce the rejects from 40% to less than 2% within two days time.

Then we had a re union of our original Delhi trainees two months after our program had ended there. At this reunion, fifteen of these men described economically important improvements which they had obtained in chemical plants, textile mills, machine shops, foundries, and in office practices. It is these accomplishments already attained by our trainees which make us confident that quality control can be a major contribution to industrial development in India. But these methods are not magic and continued progress will require effective planning and leadership.

India is a world of her own—as mysterious, different, glamorous, and under-nourished as ever pictured. We met wonderful people there—with aspirations like yours and mine. It was a great experience. It is our hope that the work of our UN team will contribute substantially to the development of India's economy—help her maintain and improve her position among the free countries of the world.

TECHNICAL PROGRAM

The broad scope of the Technical Program presented at this convention was received with tremendous interest, as evidenced by the excellent attendance at all of the sessions. Seven technical sessions were being held at the same time for each of the five periods with two speakers for each session representing nearly all types of industry.

Lively discussions followed the presentation of most papers. The various topics, including training techniques, factory application in various industries, installation of quality control systems, management's use of quality control, consumer-vendor relationship, sampling inspection, Armed Services standards, laboratory techniques, and statistical theory, all helped to provide a well-balanced program.

THE ANNUAL BANQUET

THE annual ASQC banquet was held in the Crystal Ball Room of the Benjamin Franklin hotel in

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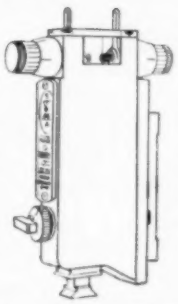
One machine is accurately checking 8 dimensions simultaneously—separating correct, oversize, and undersize parts at a rate of 2100 an hour.

Two girls now handle an inspection job that formerly took six—and human errors have been eliminated.

Eight, standard Sigma gauges, like this one: have been mounted together for rapid, accurate inspection of mass produced parts. Each gauge, accurate to within .00005", measures one dimension. More (up to 30) or fewer gauges could have been used, depending on the number of dimensions to be checked. These gauges, with standard Sigma mounting units, and special fixtures where necessary, can be set up to inspect parts a fraction of an inch long, or several inches long, a foot, or longer.



Depending on the arrangement, they can check internal and external diameters, length, depth, or other characteristics. The type of parts and the method of feeding determine inspection rates—hand feed: up to 600/hr.; semi-automatic: up to 900/hr.; fully automatic: up to 3500/hr. or more. Gauges are quickly and easily set to required tolerances and change-over from inspecting one type of part to another can be done within 10 or 20 minutes.

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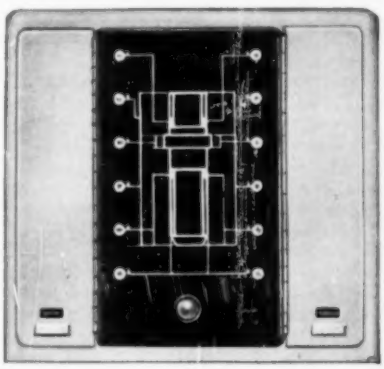
The semi-automatic Turbine and Compressor Blade Inspector (left) is an excellent example of Sigma's solution for a difficult inspection problem involving 18 dimensions. Fixtures are replaceable—each machine can inspect a wide range of different type parts. Gauges are connected to a Liquicolumn Indicator which has tubes of colored liquid set beside graduated scales—liquid levels indicate actual sizes of dimensions being checked. Magnifications can be varied easily by the user. Alternate indicator (right) uses electrical signals—green light for acceptable parts, red lights indicate dimensions below tolerances, yellow lights for those over. Built-in counters tabulate the number of parts submitted for inspection and the number accepted.



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President Simon Collier presenting the Brumbaugh Award for 1952 to Albert G. Klock and Charles W. Carter co-authors of the article "Woolen Carding Meets Quality Control" which was judged the best article on Vol. VIII.

Philadelphia on Thursday evening, May 28. Simon Collier, president of ASQC, welcomed the capacity audience of the more than 1100 persons who attended the banquet. The text of Mr. Collier's welcoming remarks follows.

Guests and Members of ASQC:

First I wish to express my sincere thanks to the Convention Committee who is responsible for this splendid convention.

When accepting the honor of becoming your president a year ago, I realized that I was entering into a task that was not going to be easy. Not easy, because I was following in the steps of men, such as George Edwards, Ralph Wareham, and Wade Weaver, who not only had vision and courage but were willing to give unstintingly of themselves. Fortunately we have had a successful year. It was successful because I had the full cooperation of all of the section officers, national committees and the national officers. This cooperation enabled us to carry on the work that was necessary to continue building our Society into a strong worthwhile organization. This splendid convention is another indication of our growth.

I thought you would be interested in just a few brief figures. When the Society was organized in February 1946 we started with 18 sections and a total membership of 1186. Today we have 71 sections, including three in Canada, one in Mexico and one in Japan, and a membership of 7360. This record shows that we have grown soundly and that we are filling a vital need in the industrial life of our country.

Last year you voted to permit our reorganizing the Board of Directors so that we would have a smaller group and thus be in a better position of administering to the needs of the Society. (Since giving this talk, you have approved all of the changes in the Constitution so that the plans may be put into effect immediately.)

I am very proud to report that the first publication of our Standards Committee entitled *Definitions and Symbols for Control Charts* was published so that it might be available for this convention. Each member of the Society will receive a copy. We also have published the first general publication entitled *Manual on Sampling Inspection by Military Standard, MIL-STD-105A.* I am sure these are merely the forerunners of many more valuable publications.

During the past year an Editorial and Business Office was opened in Milwaukee so that we might better serve your needs in improving our magazine, *Industrial Quality Control.*

Another important committee was set up during the past year—namely, the Regional Conferences Committee. This committee is to work with all groups planning conferences so that we will eliminate confliction of dates. This committee has already begun to function and a program has been prepared of all regional conferences planned for this coming year. This will enable all of us to better plan our time.

During the year an important basic plan was evolved. That was the planning and formation of divisions within the framework of our Society operations. The Textile Division was the first. They held a conference at Clemson College on August 22 and 23, 1952. It was during this conference that we presented them with their charter.

At the Princeton Conference on December 5 and 6, 1952, the Chemical Division was given their charter. These two divisions have been working diligently and have participated in our convention this week.

Your officers will carefully follow the operations of these divisions so that we might determine what our future plans will be.

A report of all of the work on the committees of the Society and your officers will be subsequently published in our magazine. I, therefore, will not take up your time and burden you with these reports.

I want to thank all of you from the bottom of my heart for the honor and help that you have all given me this past year. My only regret is that my health would not permit me to accept the honor of being your president for another year.

FOLLOWING these remarks, President Collier announced that formal charters engraved on a permanent-type paper were now available for each of the sections of ASQC and that future sections would be presented with similar charters as they are accepted into the Society. Section chairmen or their representatives were asked to pick up their charters at the ASQC booth in Convention Hall. To mark the occasion, however, President Collier formally presented the Philadelphia Section Charter to its chairman, Joseph E. Beezer.

AFTER the Section Charters had been presented, Mr. Collier presented the winners of the 1952 Brumbaugh Award—Albert G. Klock and Charles W. Carter, co-authors of the article "Woolen Carding Meets Quality Control," IQC, May 1952.

Mr. Klock received his BS degree in horticulture at Penn State College in 1937. He received his training in industrial engineering at John A. Roebling Company, Trenton, N. J., and organized and supervised an industrial engineering department at R. M. Hollingshead Company, Camden, N. J. He was an industrial engineer with Johnson & Johnson Company, New Brunswick, N. J., and for the past six years has been superintendent of the Quality Control Department at the Thompsonville, Conn., Plant of Bigelow-Sanford Carpet Company. Mr. Klock is past president of the Western Massachusetts Section of ASQC and was its 1952-53 national director.

Mr. Carter, received the BE degree in mechanical engineering at Yale University in 1942. A naval aviator during World War II, Mr. Carter has been affiliated with Combustion Engineering Corp., Eastern Aircraft

Division of General Motors, and as QC engineer with the Bigelow-Sanford Carpet Co. He is now with Rath & Strong, Inc., Boston, Mass. and is currently president of the Western Massachusetts Section of ASQC. He has been the co-author with Mr. Klock of several articles appearing in *Industrial Quality Control*. The first of these was "Quality Control in Six Minutes" in the September 1950 issue.

The Brumbaugh Award, named in honor of Dr. Martin A. Brumbaugh founder and first editor of *Industrial Quality Control*, is awarded annually to the author of that paper published in *Industrial Quality Control* which is judged to have made the greatest contribution to the development of industrial applications of quality control. It was authorized by official action of the Executive Committee on June 17, 1948, following a recommendation of the Rochester Section that such an award be established in recognition of the early work done for the Society by Martin Brumbaugh. To set up the fund the Rochester Section contributed a substantial portion of the profits from the Second Annual Convention of ASQC and the Fourth Annual Rochester Clinic. Subsequent financing of the fund has been achieved through voluntary contributions from the sections.

Previous recipients of the award are Leonard A. Seder, 1949, Irving W. Burr, 1950, and Dorian Shainin, 1951.

MAJOR GENERAL LESLIE E. SIMON, U. S. Army, made the formal presentation of the 1952 Shewhart Medal Award. Eugene L. Grant, Fellow of the Society, Professor of Economics of Engineering, and Executive Head, Department of Civil Engineering, Stanford University, was presented with this year's award in recognition of his outstanding achievement and leadership in the field of modern quality control. The text of General Simon's presentation talk follows:

I am privileged to serve you in two capacities tonight. As chairman of the Shewhart Medal Committee, I am to say a few words about the background, purposes, and intent of this award. In addition, I have been selected by this year's recipient of the award to act as his sponsor, thereby giving me the privilege of introducing the man whom our Society has chosen to receive its highest honor of the year.

The American Society for Quality Control established the Shewhart Medal Award in 1947. Its purpose is two-fold: first, to honor our distinguished colleague, to whom all of us as quality control engineers are indebted more than any other man; second, to honor annually one man from among us who appears to be most worthy, based on criteria such as, "outstanding contributions to the science of quality control, successful promotion and management of quality control programs, and service to the art and to the Society." Finding men in the Society who fulfill the qualifications is easy: determining who appears to be most worthy is a rather difficult matter. Your committee used all means from the democratic process of soliciting nominations to statistically tabulating data for guidance of best judgment. It finally decided upon a man to receive this year's honor who not only leaves each committee member with no doubts regarding the selection, but who I am sure will receive the unqualified acclaim of the entire society. Your committee is proud to have selected a man who so eminently fulfills the qualifications for Shewhart Medalist, who is so well known to this Society, who has been of such great help to so many of us, who is our warm friend as well as worthy colleague, Professor Eugene L. Grant.

A native of Chicago, he is a graduate of the University of Wisconsin and of Columbia University. Culminating a career as teacher and consultant, he has been on the faculty of Stanford University since 1930 and is now Professor of Economics of Engineering and executive head of the Department of Civil Engineering and chairman of the Committee on Industrial Engineering. He has been a consultant to the United States Army Engineers, the United States Bureau of Reclamation, and at present is a member of the Sampling Inspection Policy Board advisory to the Chief of Naval Research.

He is author of a number of articles and books on various aspects of engineering economy, depreciation, and quality control. In 1944, he was awarded the Thomas Fitch Rowland Prize of the American Society of Civil Engineers. His book, "Statistical Quality Control" has become a standard textbook in the United States and has been distributed throughout the world.

His activities in statistical quality control go back to 1928 when he first came in contact with the inspection and quality control activities of the Bell Telephone Laboratories and Western Electric Company. In 1929 he initiated at Stanford, a course in statistics for engineering students which was given annually until 1944 when it was succeeded by a course of statistical quality control. He supplied the push which made it possible to follow the suggestion of Dr. W. Edwards Deming to Prof. Holbrook Working of Stanford and conduct a ten-day course at Stanford in July 1942 and at Los Angeles in September of that year. He was one of the four-man instructional staff of this fore-runner of the ESMWT Short Courses.

The success stories at follow-up meetings at Los Angeles were sufficiently striking to convince the Stanford group that here was a tool that could contribute to the war effort. Through the efforts of Drs. Shewhart, Wilks, Deming, myself and others, Professor Paul T. Norton, Jr., of the Office of Production Research and Development was convinced that SQC could become more useful to industry. The medalist forthwith provided advice to Professor Norton, his old college roommate, which led to the joint OPRD-ESMWT program.

Shown here are Maj. Gen. Leslie E. Simon, Prof. Eugene L. Grant and Simon Collier. Prof. Grant was chosen to receive the 1952 Shewhart Medal for outstanding services to the field of quality control. His address is presented on page 31.

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He was active in formation of the San Francisco Bay Area Section of ASQC and has been a member of the Educational Committee and of the Board of Directors of the National society. He is a member of the Standards Committee of ASQC and of the Editorial Board of *Industrial Quality Control.*

Although he carries the honor of being a Fellow of the Society he takes particular pleasure in a diploma representing him as honorary president of the Mexico City Section.

Ladies and Gentlemen, it gives me great pleasure to introduce the Shewhart Medalist for 1952—Professor Eugene L. Grant.

Professor Grant's address accepting the Shewhart Medal Award is presented as a separate article on page 000 of this issue.

General Simon is Chief of the Research and Development Division, Office of the Chief of Ordnance; Assistant Chief of Ordnance; and author of the text *An Engineer's Manual of Statistical Methods.* He is a Fellow of the American Society for Quality Control and has been active in fostering the growth of industrial uses of statistics since his assignment to Picatinny Arsenal in 1933. He was the Society's first member to be so honored receiving the 1948 Medal. Other Medalists since then are Harold F. Dodge, 1949, Martin A. Brumbaugh, 1950, and George D. Edwards, 1952.

ON the lighter side were some appropriate entertaining comments offered by the guest speaker for the evening, Dr. August Weiseman.

LADIES' PROGRAM

The Ladies' Program this year featured a coffee hour in the Lafayette room of the Benjamin Franklin hotel each morning where the ladies could meet and get acquainted with each other over a leisurely cup of coffee or tea and cakes. This was a most popular room, filled to capacity every morning from 9:00 until nearly noon.

On Wednesday afternoon three busses took the ladies on a tour of historic Valley Forge, leaving the Benjamin Franklin at 1:00 p.m. and returning at approximately 6:30 p.m.

Thursday afternoon featured a luncheon and fashion show in the Garden Terrace Room, a most successful affair with 143 ladies in attendance. The fashion show was very beautifully managed by The Lillian Albus Shop of Haddonfield, N. J. They were assisted by the Florence Epphardt shop with hats, Famous-

Brand shoes and the Eleanor Lind shop with accessories, all of Haddonfield, N. J.

On Friday morning a special, unscheduled tour was made by approximately one-third of the registered women to the duPont estate, "Winterthur," near Wilmington, Delaware. This tour included the Henry duPont mansion, museum, and grounds.

The remainder of the ladies went on walking or shopping tours of central Philadelphia and its many historical places.

CONVENTION COMMITTEE

Under the general chairmanship of William Masser, the committees functioned smoothly and with complete cooperation. The companies that the committee members work for (at this point many of us wonder for whom we actually do work) are unanimously voted a "thank you" from the entire convention.

The committee men received the whole hearted cooperation of the visitors and Convention Bureau, the city administrators, the leading hotels, Philadelphia Transportation Company, Convention Hall managers, The Eagle Press Company, and others too numerous to mention here.

The committee members who took a major part in the arrangements are:

William Masser—General Chairman
General Electric Co.

Fred R. Bailey—Secretary-Treasurer The Electric Storage Battery Co.

Publicity

J. Mehalek, *Chairman*, The Budd Company
C. Larson, Frankford Arsenal
R. Jacobs, RCA Victor
H. Wohlers, The Autocar Co.

Registration

J. V. Hart, *Chairman*, Minneapolis-Honeywell Regulator Co., Brown Instrument Div.
P. J. Ries, Minneapolis-Honeywell Regulator Co., Brown Instrument Div.
W. W. Frankhouser, Sharpe & Dohme, Inc.

Arrangements

G. R. Geiger, *Chairman*, International Restance Co.
W. R. Reeves, RCA Victor
T. J. Moran, Wyeth, Inc.
J. M. Sherman, Standard Pressed Steel

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NOTE ON BRUMBAUGH AWARD

The paper "Woolen Carding Meets Quality Control," published in the May 1952 issue of this journal, was selected for the Brumbaugh Award as the best paper in Vol. VIII. Its author, Messrs. A. G. Klock and C. W. Carter, received the Award at the Annual ASQC Banquet in Philadelphia on May 28.

For those of our readers who may thus be prompted to take a fresh look at this paper, we repeat here an errata notice that appeared in the July 1952 issue.

1. On p. 35, delete the word "Whitin" from the caption for Figure 1.
2. On p. 37, the chart shown as Figure 6 should appear as the chart for Figure 7.
3. On p. 37, the chart shown as Figure 7 should appear as the chart for Figure 9 on p. 38.
4. On p. 38, the chart shown as Figure 9 should appear as the chart for Figure 6.
5. Captions on Figures 6, 7 and 9 are correct as shown.

Proceedings
E. M. Schrock, *Chairman*, Koppers Co.

Exhibits
S. Wirtschafter, *Chairman*, I-T-E Circuit Breaker Co.
E. E. Patterson, I-T-E Circuit Breaker Co.
P. E. McGrath, Jr., U. S. Pipe & Foundry Co.
J. Braverman, Frankford Arsenal

Reception
A. F. Bottke, *Chairman*, Ternstedt Division, General Motors Corp.
C. J. McClintock, Hunter Spring Co.
F. C. Schulze, Hunter Spring Co.
M. E. Wolcott, Arcos Corp.

BOOK BOOTH

An opportunity for industry people to "Meet the Author" of some of the technical books that they use as guides and references was provided at the Book Booth in the exhibits area.

Among the many authors present during the three day convention were Major General Leslie Simon, U. S. Army; Dr. J. M. Juran, New York University; Eugene L. Grant, Stanford University; Dr. A. V. Feigenbau, General Electric Co.; John D. Heide, U. S. Rubber Co.; Dr. S. S. Wilks, Princeton University; E. M. Schrock, Koppers Co.; H. A. Freeman, Massachusetts Institute of Technology; Dr. W. J. Youden, National Bureau of Standards; Dr. W. A. Shewhart, Bell Telephone Laboratories; Earle Buckingham, Massachusetts Institute of Technology. These authors answered a great many questions about their books and also autographed them as they were bought.

During the three days of session, the Book Booth sold 275 books. The response to this type of technical sales was sufficiently encouraging to make it well worth while for future conventions to make it a major consideration in committee assignments.

EXHIBITS

The largest number of booths (72) and more individual concerns (44) exhibited at the 7th ASQC Convention than at any previous one. The booths were sold out six weeks before the convention started and it is expected that those companies wanting to exhibit and couldn't will do so next year.

The Book Booth occupied three booths. The American Society for Quality Control occupied two booths, and the Proceedings Committee occupied one booth. The remaining 66 booths were occupied by:

General Electric Co., Schenectady, N. Y.
Greenfield Tap and Die Co., Greenfield, Mass.
A. G. Davis Gage & Engineering Co.
Ralph E. Burt Associates, Springfield, Mass.
Marchant Calculators Inc., Oakland, Cal.
Elliott Service Co., Mt. Vernon, N. Y.
Federal Products Corp., Providence, R. I.
Optical Gaging Products Inc., Rochester, N. Y.
Frank T. Griswold Co., Wayne, Ind.
The Van Keuren Company, Watertown, Mass.
American Cystoscope Co., New York, N. Y.
Cleveland Instrument Co. Cleveland, Ohio
Moore Products, Philadelphia, Pa.
Lawley Granite Surface Plate Co.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Cosa Corporation, Chrysler Bldg., New York, N. Y.
Sheffield Corporation, Dayton, Ohio
DoAll Company, DesPlaines, Ill.
Johnson Gage Co., Bloomfield, Conn.
American Instrument Co., Silver Springs, Md.
Micrometrical Mfg. Co., Ann Arbor, Mich.
N. A. Woodworth, Ferndale, Mich.
Brush Development Co., Cleveland, Ohio
L. S. Starrett, Athol, Mass.
Jones & Lamson Machine Co., Springfield, Vt.
Friden Calculator Co., San Leandro, Cal.
Collins Micro-Flat Co., Los Angeles, Cal.
Bryant Chucking Grinder Co., Springfield, Vt.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Pratt-Whitney Div., Niles-Bement-Pond, West Hartford, Conn.
Cullen Manufacturing Co., Racine, Wis.
Monroe Calculating Co., Inc., Orange, N. J.
Nilsson Gage Co., Poughkeepsie, N. Y.
Bausch and Lomb Optical Co., Rochester, N. Y.
Size Control Co., Chicago, Ill.
Tubular Micrometer Co., St. James, Minn.
Webber Gage Co., Cleveland, Ohio.
Service Diamond Tool Co., Ferndale, Mich.
Coca Cola Company, New York, N. Y.
Met-L-Chek, Hawthorne, California
Lectro-Etch, Cleveland, Ohio
New Hermes Engineering Machine Co., New York, N. Y.
John Chattillon & Sons, New York, N. Y.
Scale Specialties and Systems Co., Roseland, N. Y.
Uster Corp., Charlotte, N. C.
King Co., Ardmore, Pa.
Magnaflux Corp., Chicago, Ill.

FRENCH TEAM STUDIES SQC IN U.S. INDUSTRY

Under the sponsorship of the Mutual Security Agency a team of fifteen French industry and government representatives spent the five weeks from Mar. 5 to Apr. 16 studying the use of SQC techniques in various industries throughout the United States. The purpose of this visit, of course, was to permit the team members to examine at first hand the relation between statistical quality control methods and our industry's high production.

The French National Productivity Committee had pointed out that quality control methods as such were used in only a few sectors of French industry and had expressed the belief that more and better production could be achieved by a more wide-spread application of these principles. To assure that SQC techniques will become more widely available to French industry, the results of the team's study here will be disseminated by the French National Productivity Center with the help of various industry productivity committees, trade associations and trade publications.

A similar study was conducted by a team of industry personnel from Great Britain last year. Some of the conclusions reached by this group are presented by J. M. Juran in his "Management's Corner" elsewhere in this issue.

Industrialists and Professors in Quality Control

—A Look Back and a Look Ahead

EUGENE L. GRANT

Stanford University

IN THE rapid growth of modern methods of quality control in the United States during the past ten years or so, professors of engineering, mathematics, and statistics have played an important part. Perhaps there is no other field in which so many new friendly contacts between professors and industrialists have developed in such a short time.

Many of these contacts originated in extension-type courses dealing with the application of statistics to quality control. Some of these courses were short full-time courses, some were evening courses, and some were in-plant courses. Some have been under academic sponsorship and others have been sponsored by industrial companies. Most of ASQC's 65 sections seem to have one or more favorite professors who take an active part in section activities, are invited freely into local industrial plants, and are consulted informally about various statistical matters. Certain regions also have favorite groups of professors, such as the Midwest's famous "four horsemen of quality control."

The evidence seems to be conclusive that the overall effect of these many courses in statistical quality control has been good for American industry. I think that the professors who have been working in quality control will agree with me that this has also been good for the professors. It is not only that the professors have made new friends through their contacts with the industrialists. Through these contacts they have learned many things that have improved and enriched the teaching of their regular college and university classes. Moreover, there is a special stimulus and satisfaction in teaching people from industry because industrialists are in a position to make such immediate applications of classroom material to practical problems. Nevertheless, not all industrialists have been entirely happy about the invasion of their bailiwick by professors.

THIS was particularly true in the days of the war-time courses. I remember quite vividly a personal experience that happened just ten years ago, in May, 1943, when I called on a leading official of a local office of the War Production Board. In this case I was representing Stanford University, trying to get his help in inviting war contractors to send personnel to an intensive course in Quality Control by Statistical Methods that we were to give the following month. This was to be an ESMWT (Engineering, Science, and Management War Training) course given in cooperation with an agency of his own War Production Board, the OPRD (Office of Production Research and Development).

This man told me that although he was in a position to encourage industrial concerns to send people to our course, he definitely would not do so. In effect, he told me that, if we liked, we could carry on such silly activities for our own students on our campus, but that if we persuaded busy employees of war plants to spend eight valuable days on such a useless venture, we were interfering with the progress of the war. Although this man spoke more plainly to me than did most other industrialists, many of his fellow industrialists took the same attitude at that time. Nearly all the professors who promoted similar OPRD-ESMWT courses were destined to meet this viewpoint during the years 1943-45.

The author, Prof. E. L. Grant —1952 Shewhart Medallist

The events of the last ten years have proved that this industrialist was wrong in his expressed view that the statistical techniques originally developed for controlling quality of telephone equipment could be of little use outside of the telephone industry. He also was wrong in his view that the kinds of contacts between professors and industrialists that existed in the OPRD-ESMWT type of quality control courses could not be of any use to industrialists.

I ADMIT that in May 1943 I took rather a dim view of the attitude of this WPB official. But, from the perspective of ten years, I can see that his viewpoint in 1943 might have seemed more reasonable than my viewpoint and that of my fellow professors. What we professors had at that time was faith—faith that statistical techniques would prove to be widely useful in the control of quality in many different kinds of manufacturing. We were *professors* in another sense of the meaning of the word, expressed by the dictionary as "One who professes; especially one who makes or has

*Shewhart Medalist Address, Seventh National ASQC Convention, Philadelphia, Pa., May 28, 1953.

made a profession of faith or allegiance." In 1943 we had only a limited amount of evidence from industry to back up his faith.

Our faith was really in the widespread applicability of the mathematics of probability to a great variety of situations. We were certain that industrial quality characteristics were frequency distributions, that frequency distributions had averages and dispersions, and that they might be stable or unstable with respect to time. We were also certain that all sampling procedures —in industry as elsewhere—were subject to the laws of chance. And we had faith that the statistical viewpoint and its associated tools could be used in industry to improve quality and reduce cost.

This faith has turned out to have been justified. One only needs to look at the technical program of this convention to realize the widespread use of statistical quality control today. The more than sixty companies represented on this program sound like their names were taken from an industrial Who's Who of the United States and Canada. Technical papers given at the meeting deal with applications of statistical quality control to aircraft, automobiles, chemicals, farm machinery, food products, metals, ordnance, paper, petroleum, pharmaceuticals, plastics, rubber, textiles, and vacuum tubes.

A SPECIAL aspect of these early courses for industrialists was the fact that even the basic qualitative concepts of statistics were completely new to many of the industrialists. For example, nothing in grade school eduction or high school education or in most college education had presented the idea that—in the classic words of Dr. C. G. Darwin—"every number has a fringe, that it is not to be regarded as exact but as so much plus or minus a bit, and that the size of this bit is one of its really important qualities." Neither had the usual educational process presented such a simple idea as the one that in drawing conclusions from a sample, the absolute size of the sample is usually more important than its relative size.

Perhaps it was this novelty of the statistical concepts and techniques that constituted such a challenge to some of the industrialists attending the early OPRD-ESMWT courses. I think that most of the early trainees made no immediate applications of statistical methods in their own plants. But a few made spectacularly successful applications—particularly applications of control charts—that reduced spoilage and rework and improved product quality. These success stories were reported in the follow-up seminars that were held at monthly intervals for five or six months after each intensive OPRD-ESMWT course. These reports, in turn, stimulated other industrialists to use statistical quality control methods in their own plants. Successful applications in an industrial area led to a demand for part-time evening courses and in-plant courses in statistical quality control. Some of these were taught by the local professors who had taken part in the teaching of the intensive course. Others were taught by industrialists, frequently by the men who had been introduced to the statistical techniques in the intensive courses and who had been making such good applications of them in their own plants.

This sequence of events converted some of the industrialists into professors in two senses of the word. They were professors in the sense of being teachers and they also were professors in the sense of being persons who professed what seemed to them and others to be a new faith. The words *evangelist* and *convert* were often used in discussions of statistical quality control during the 1943-45 period.

An excellent concise statement of current progress is given in an editorial "Recent Trends in QC" by Professor Irving Burr on page 3 of the March 1953 issue of *Industrial Quality Control*. This article is a most impressive summary of accomplishments. We have indeed come a long ways from the OPRD-ESMWT days in the general level of statistical sophistication in industry as well as in the number and variety of applications. I think all of us who were actively associated with that program in 1943-45 are amazed at what has happened in such a short time.

Although eventual widespread use of statistical methods of quality control was inevitable, I am sure that such use was greatly accelerated by the enthusiasm for statistical methods that the OPRD-ESMWT program generated among individuals in so many industrial companies. In a sense, also, this program was the forerunner of ASQC. Many of the local quality control societies that combined in 1946 to form ASQC were formed by the members of the monthly follow-up sessions of the OPRD-ESMWT courses. And some of the other local societies were started by people who did so as a result of attendance at one of these courses.

THE BEST history of the OPRD-ESMWT program is in an article written shortly after its termination by my colleague, Professor Holbrook Working of Stanford University. This article, "Statistical Quality Control in War Production," appeared in the December 1945 issue of the *Journal of the American Statistical Association*. Dr. Working directed this program from its start in April 1943 until he returned to Stanford in mid-1945 and turned over the reins to his co-worker in the program, Professor Edwin Olds of Carnegie Tech.

I should like to add a footnote to this history and to describe here the sequence of events, each unlikely in its timing, that led to the adoption of this program. Although a number of people who were close to these events know this story, I think it is not well-known among quality control people. According to my view of the matter, the key event in the entire sequence was the timing of a visit that a new baby made to his grandfather in Ontario, California.

The program would not have been considered for adoption except for a proposal made by Dr. Shewhart to the newly formed OPRD. This was a proposal on behalf of the Committee on Applied Mathematical Statistics of the National Research Council. It was suggested that the OPRD undertake a program to stimulate the use of statistical techniques as applied to quality control in war industry. At that time the only existing pattern for such a program was the one in England, where a government consulting and advisory staff trained in statistical methods was engaged in advice to industry on specific problems involving quality control.

One day in February 1943, Dr. Shewhart, accompanied by Professor S. S. Wilks of Princeton University, went to Washington to make an oral presentation of this proposal to the Division of Industrial Processes and Products of OPRD. They spent the day talking to Professor Paul T. Norton, Jr., of Virginia Polytechnic

Institute, who had assumed his duties as chief of that division only a few days before.

One coincidence was the date of the Shewhart-Wilks visit in relation to Norton's presence on the scene. Their visit to OPRD originally had been scheduled for some weeks earlier, but they had postponed it at the last minute. If they had come on the original date, they would have talked only to Norton's two assistants. These assistants—like most industrialists in 1943—were unfamiliar with statistical quality control; they joined Norton in the actual conference but reported to him at the end of the day that they were completely confused about this topic. If the Shewhart-Wilks visit had occurred on the earlier date, I suspect that OPRD would never have acted.

Norton, on the other hand, had heard of statistical quality control and believed that these techniques would eventually be used in many industries. Nevertheless, he ended the conference believing that there was no practical action that could be taken by OPRD to promote their use during World War II.

Because I had dinner with him that same evening, I can report his views at first hand. It happens that Norton and I were roommates during our student days at the University of Wisconsin. By another coincidence of timing, I was in Washington for two days at that particular moment. I had come as a last minute substitute for my boss, Dean S. B. Morris, who developed a bad case of influenza just before he was scheduled to leave for Washington to attend a meeting of regional advisers of ESMWT.

During our dinner, Norton told me of the Shewhart-Wilks visit and of his reactions. I then told him the story of two intensive full-time courses in statistical quality control that Stanford University had given during July and September of 1942, one on the campus and the other in Los Angeles. These had been given because of a suggestion made to Professor Working by Dr. W. Edwards Deming who, among his other government duties at that time, had been Adviser in Sampling to the Chief of Army Ordnance. Deming was familiar with the organization of these courses, as we had persuaded him to serve on the teaching staff of both of them. I suggested to Norton that an OPRD program might be patterned on these Stanford ESMWT courses, and I put him in touch with Deming. The general plan for the OPRD-ESMWT program was worked out jointly by Deming, Norton, Leslie E. Simon (then Colonel and Director of the Ballistic Research Laboratory), and Dean George Case, Director of ESMWT. Professor Working was persuaded to take a leave of absence from his duties in Stanford's Food Research Institute to direct the program. The history of the actual program from this time forward has been well told in Working's article to which I have already referred.

AT THIS point in my story, I approach the baby's visit to his grandfather in Ontario, California in September 1942, five months before my meeting with Norton. I am sure that if it had not been for a series of strikingly successful applications of statistical quality control in the Ontario Works of the General Electric Company during those five months, my advice to Norton would have been that intensive courses in statistical quality control for key personnel of war industry had been given a fair trial but had not succeeded. Nearly sixty people, many of them in important positions, had attended our two courses. Dr. Working and I had kept in touch with most of them, both by correspondence and plant visits and by a series of Sunday follow-up meetings held in Los Angeles at six-week intervals for the trainees to come together, discuss technical questions, and give progress reports. We found that in most cases the trainees initially had made no applications whatever. Even the few that had made one or two technically successful applications had run into discouragements and frustrations. Only at Ontario was there a sufficient program to demonstrate how statistical techniques could be used throughout a plant to conserve scarce manpower and materials by reducing spoilage and rework, and to improve inspection procedures.

The Ontario program had been carried out by Wyatt H. Lewis. I should explain that in normal times, the Ontario Works makes electric irons. Like many other plants that no longer could make civilian products, it had rapidly been converted to the manufacture of a diversity of war products. Like other plants that had made this conversion, it had its share of troubles with spoilage and rework and with inspection of the new products. Lewis, a chemical engineer who had previously been working in the citrus by-products industry in Ontario, had joined the General Electric staff shortly before our September course in Los Angeles. The project for which he had originally been hired had not materialized as rapidly as expected, and he had been assigned to study certain inspection problems.

Lewis was introduced to the Shewhart-Dodge techniques in our September 1942 course. He attended this course in spite of the fact that until the evening before the course started no one at the Ontario Works had heard about our course. In our ignorance in the Stanford ESMWT office, we were unaware of the existence of this important industrial plant situated among the orange groves of southern California and therefore sent no invitation to Ontario. In our behalf, however, I can plead that we sent a cordial invitation to the San Francisco office of the General Electric Company and received a polite refusal with the statement that the company had no mass production operations on the West Coast that could use statistical quality control techniques.

One of our invitations had gone to the Aluminum Company of America and this company had assigned a young engineer to attend. This engineer, Joseph Tangeman, was the son of Mr. W. H. Tangeman, works manager for General Electric at Ontario. At that time the Joseph Tangemans had a new baby son; on the Saturday evening before our course started, they took the baby to Ontario to be viewed by his proud grandparents. Joe told his father about the Stanford course that he was to attend in Los Angeles starting on Sunday morning and his father made a quick decision to send Lewis to our course.

FROM the viewpoint of ten years later, I can see a number of reasons why Lewis was successful in making immediate good applications of statistical quality control whereas other good men ran into so many difficulties. He was fortunate in having top management support from the start. I think matters were

helped considerably by the fact that Ralph Wareham, then of General Electric, was a temporary professor—a member of the teaching staff of our course. Wareham was able to visit the Ontario Works while the course was under way. We did not have the phrase "operations research" in industry in those days. But if you accept the description of an operations researcher as a "staff man with a hunting license," this applied to Lewis. It seemed to me as I visited other war plants in those days that there were good hunting grounds in the quality control problems of nearly all plants. But not enough hunting licenses were issued to good hunters and much of the big game seemed to be protected.

A number of the first applications at Ontario were described and discussed at our follow-up meetings in Los Angeles. The mutual stimulus that occurred there from the exchange of experiences was repeated in the follow-up sessions of the OPRD-ESMWT courses all over the country.

You can see now why I think the timing of the Tangeman baby's visit to his grandfather was so important to quality control in American industry. If this visit had been delayed for a week or more, I fear that there would have been no good evidence in February 1943 that an eight-day contact between professors and industrialists could cause industrialists to make effective use of statistical techniques in quality control. My story to Norton following the Shewhart-Wilks visit would necessarily have been an account of a valiant attempt that did not appear to have succeeded. Such a story from his ex-roommate would doubtless have reinforced Norton's initial judgment that a project in statistical quality control was not likely to be a productive way for the OPRD to use its resources. The professors would never have been turned loose on the industrialists to explain statistical concepts and techniques in the manner envisaged by Deming and developed by Working and Olds. There would have been no evangelists and no converts. I suspect that we would not now have an ASQC with 65 chapters and 7,000 members and a big Philadelphia convention.

STATISTICAL quality control may be viewed as one of the tools by which industry achieves the goal of more and better products at lower cost. As such a tool, it can contribute both to an improved standard of living and to better national defense. Only a small fraction of its total possible contribution has been made at this time. Future developments involve not only a much more widespread use of the simple statistical tools in quality control but also a greatly increased use of advanced statistical methods and an expansion of these methods based on theoretical work not yet done.

Professors will contribute to these future developments in three ways: (1) through taking part in extension-type courses for people already in industry, continuing the type of activity started in 1943-45; (2) through courses in statistics and statistical quality control for regular college and university students, particularly students in engineering and science and in industrial management; and (3) through participation in research—particularly research in mathematical statistics—that will extend the frontiers of knowledge in this field.

There are natural differences between the viewpoints of professors and industrialists on various matters. I should like to conclude by commenting on one difference that I have observed—a difference in attitude toward diagnosis and pressure as means of realizing desired quality objectives.

Statistical techniques contribute to better quality control in various ways. One group of contributions may loosely be described as involving better diagnosis of quality problems; another group may be described as involving more effective pressures for quality improvement. Some examples of diagnosis are better determination of the capabilities of a production process, identification of assignable causes of variation, determination of the calculated risks in acceptance sampling, better planning and interpretation of industrial experiments. Some sources of better pressure come from more valid comparisons of current quality with standards of quality performance, incentives for quality improvement created by charging the producer with the cost of screening rejected lots in AOQL inspection, incentives created by the threat of tightened inspection in AQL plans, incentives for improvement created by the rejection of entire lots rather than merely individual items of product.

Generally speaking, it should be obvious that both diagnosis and pressure are important aspects of the control of quality. Neither should be disregarded by professors in instruction or research or by industrialists in the carrying out of quality control programs. Nevertheless, it has seemed to me that some professors view quality control problems almost entirely in terms of diagnosis and some industrialists view them almost entirely in terms of pressure.

A professor's bias in favor of diagnosis may lead him, for instance, to pay insufficient attention to the broad strategy of acceptance sampling procedures and to overemphasize the importance of the operating characteristics of individual acceptance plans. But a professor's bias is less likely to have a harmful effect than an industrialist's bias. The professors are important in the quality control picture chiefly because they influence the actions of present and prospective industrialists.

In the last analysis, quality troubles must be corrected one by one. An industrial executive's bias in favor of pressure may prevent the best tools being used for the diagnosis of such troubles. Moreover, a bias in favor of pressure may lead to a disregard for the need to understand statistical concepts and principles. Sometimes an industrial executive may misuse the statistical approach to support his preconceived ideas regarding the kinds of pressures to be used. In such cases, unsatisfactory results are likely to be blamed—most unfairly—on the use of statistical techniques.

IN A RECENT conversation with a professor of statistics from another country, I encountered a good example of the professorial bias. This professor remarked that Americans had laid too much stress on standard tables for acceptance sampling; he had recommended to industry and government that such tables not be used in his country. His view was that whenever a quality control problem was met in industry, industrial workers should collect data for several months. Then

a professional statistician should be called in. In a short time, the statistician could analyze the data and tell the manufacturing people what to do.

I am sure that all of us here will agree that this is a very unrealistic view of the way in which statistical techniques should contribute to quality control. It not only represents an overemphasis on diagnosis but also reflects this professor's opinion that the use of statistical techniques should be reserved for a small class of professional specialists.

I am glad that our developments in this country have been along opposite lines. A reasonable objective for professors is the encouragement of a widespread understanding of statistical principles with the expectation that it is the industrialists who will be skilled in their application. This was, in fact, the underlying good idea that Deming had in his original proposals that led to the wartime quality control courses.

ONE FORECAST can be made with confidence about future applications of statistical methods to quality control. This forecast is that there will always be troublesome difficulties and interesting problems. Back in 1943, Wyatt Lewis suggested to me that the motto of the quality control man should be "Never a dull moment!" I am sure that this is still an appropriate motto in 1953 and will continue to be so in 1963. Or, for that matter, in 2053. I trust that in the future, as in the past, professors may do their share toward resolving the difficulties and solving the problems.

Management's Corner

J. M. JURAN, Editor

Correspondence is invited on potential contributions or problems appropriate for discussion in this department. Address your suggestions to:

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We Are Studied by a British Team

A British specialist team on "Inspection Methods in Industry" visited these United States late in 1951. They visited 22 factories and various institutions, educational, industrial and otherwise. They had previously studied British practice as well. Their report* "Inspection in Industry" was released in February, 1953. It is a useful mirror image of American practice, worth studying by Americans as well as by British.

The principal observations of the report include (a) the new breadth which the concept of control of quality has given to the former narrower concept of inspection (b) the importance of modifying organization structure if force is to be given to the new concepts (c) influence of military contracts on management awareness of modern techniques (d) the importance of *action* based on inspection data (e) the advances in vendor relations (f) the increased use of indicating gages in lieu of fixed limit gages (g) the opinion that the best British practice is not behind the best American.

*Available from Office of Technical Service, Department of Commerce, Washington, D. C.

The Team recommendations include:

(1) A new technical job classification for skills in statistical methods, measurement and organization

(2) Statistical methods as part of the "Production Engineering" curriculum

(3) Intensive courses in statistical methods for men in industry

(4) Recognition of Quality Control within the Professional Society structure in Britain

(5) Standardization of government inspection procedure

(6) Greater mechanization in inspection

(7) Clearer and stronger status for inspection departments and inspection personnel

(8) A leading role by Management in quality-mindedness and in cooperation within the company

(9) Stronger means of collaboration between departments on quality matters

The 74 page report is in British dialect, the spelling, the idioms, and the use of emphasis through understatement. The scope of the report can be judged from the chapter headings:

Principles of Inspection
Techniques and Management
Techniques of Inspection
Tools of Inspection
Personnel of Inspection
Labor-Management Relations
Setting up a Quality Program
Military Inspection and Industry
Some Special Techniques

The word "Inspection" is used in *a broader sense than we use it,* as it covers both product acceptance and defect prevention. Collectively the chapters constitute an interesting organization of the subject, and a "different" yet useful set of points of emphasis. Sprinkled throughout the report are cogent observations, many laudatory and some critical of American practice, all in a constructive view. A few of these observations:

> All of the members of the Team are of the opinion that a positive forward step in quality control organization and technique is taking place in the U.S.
>
> Analysis of (quality control) failures has shown that they can be ascribed to poor preparation . . . or

to over-emphasis in some particular direction rather than to any lack of truth in the basic conceptions of quality control.

The Team was much impressed by the cooperative spirit which appeared to characterize American managements.

The change of name from inspection department to some other including the term quality or quality control is significant . . .

. . . insistence on action is one of the strongest impressions gained by the Team during the tour.

The Team was very much impressed with the excellent service rendered to production and quality control by laboratory units.

There is general agreement that (quality control) analysts should be practical engineers with a knowledge of statistics, rather than statisticians with a knowledge of engineering.

Where there has been a failure in the introduction of a quality control program, an important factor often encountered is undue preoccupation with statistical methods before carrying out the more obvious improvements.

. . . the inspection department invariably plays a major role in the solving of current manufacturing problems.

The British are to be commended for the scope and the incisiveness of their report. The report is rewarding reading for those who would see the American practice in perspective.

Bibliography

JOSEPH MOVSHIN, Editor

Assisted by the Editorial Committee, St. Louis Section, ASQC

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9220 Old Bonhomme Road
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APPLICATION—AIRCRAFT INDUSTRY

A REALISTIC APPROACH TO STRUCTURAL WEIGHT ESTIMATION, Arthur Schnitt and William H. Buckley, Bell Aircraft Corporation
(Aero Digest—v. 66, n. 2, Feb. 1953, p. 76)

The use of limited statistical techniques in the considerations of the design problem of structural weight of aircraft is discussed. The statistics is essentially supplemental to many other considerations.

APPLICATION—CHEMICAL INDUSTRY

NEXT TIME, USE STATISTICS, P. Ferencz and B. H. Lloyd, Canadian Industries Limited, Montreal, Canada
(Chemical Engineering—v. 60, n. 4, Apr. 1953, p. 219)

This article outlines several of the basic techniques of SQC, namely, sampling techniques, significance of deviations, control charts, etc. Examples of the application of these problems in the field of chemical engineering are given.

STATISTICS CAN HELP IN SOLVING PROCESS PROBLEMS, P. Ferencz and B. H. Lloyd, Canadian Industries Limited, Montreal, Canada
(Chemical Engineering—v. 60, n. 5, May 1953, p. 207)

This article is essentially a continuation of the article "Next Time, Use Statistics," in a previous issue of Chemical Engineering. Distribution of variables and relation between variables are discussed, and engineering design estimates are also considered.

APPLICATION—PETROLEUM INDUSTRY

STATISTICAL QUALITY CONTROL—APPLICATIONS AND LIMITATIONS, L. J. McGovern, Magnolia Petroleum Company, Beaumont, Texas
(Petroleum Refiner—v. 32, n. 2, Feb. 1953, p. 121)

Statistical quality control techniques are considered from the standpoint of their application to the petroleum refinery. These techniques are considered as tools to study the random chance variation that occurs from plant to plant and batch to batch. The identification of specific assignable causes is the basic problem. Limitations are noted for the techniques available and methods of application at this time.

APPLICATION—ELECTRICAL INDUSTRY

HOW TO EVALUATE ASSEMBLY TOLERANCES, R. H. Johnson, Westinghouse Electric Corporation
(Product Engineering—v. XXIV, n. 1, Jan. 1953, p. 179)

This article discusses the application of the frequency distribution concept to quality characteristics particularly in the electrical field. The combinations of tolerances of electrical circuits based on the distribution of the tolerances of each component is developed. Samples of the calculations for finding combined tolerances are given.

APPLICATION—METALLURGICAL INDUSTRY

QUALITY CONTROL IN THE SMALL FOUNDRY, W. J. Sommer, Plainville Casting Company
(Foundry—v. 80, n. 12, Dec. 1952, p. 92)

The small foundry has distinct problems with respect to the installation and application of quality control procedures. This article discusses the application of simple records and charts as a practical quality control procedure for the small foundry.

ENGINEERING AND EXPERIMENTS

STATISTICAL QUALITY CONTROL IN RELATION TO ENGINEERING, Walter S. Oliver, Detroit Gear Division, Borg-Warner Corporation (Automotive Industries—v. 107, n. 12, Dec. 15, 1952, p. 38)

The author indicates that while the techniques of applying statistical concepts to design problems are not widely used and fully developed, they have advanced beyond the theoretical. Based upon the normal distribution, the author discusses the concept of tolerances in terms of the distribution of characteristics. The statistical combination of tolerances is considered.

Some impressive results of an example of this technique are given.

DESCRIBING UNCERTAINTIES IN SINGLE SAMPLE EXPERIMENTS, S. J. Kline, Stanford University, and F. S. McClintock, Massachusetts Institute of Technology
(Mechanical Engineering—v. 75, n. 1, Jan. 1953, p. 2)

This article discusses the problem of measuring uncertainties in single sample experiments. The author develops a method of doing this by estimating the error of each of the factors in the experiment and combining these statistically to form a measure of the limits of uncertainty.

INDUSTRIAL MANAGEMENT

STATISTICAL WORK MEASUREMENT CONTROL, Dr. Robert N. Lehrer, Georgia Institute of Technology
(Advanced Management — v. XVII, n. 8, Aug. 1952, p. 10)

This article applies the basic philosophy and techniques of the control chart to several problems in work measurement control. Examples of possible applications include standard cost analysis, overall worker productivity analysis, individual worker productivity analysis, department or crew productivity analysis, analysis of productivity by class or type or work, analysis of individual productivity during daily work periods and machine utilization studies.

CHARTS IMPROVE METHODS FOR DETERMINING DOWNTIME, G. Nadler, Washington University, and D. H. Denholm, Chase Bag Company
(The Iron Age—v. 170, n. 22, Nov. 27, 1952, p. 110)

The p chart (as based on the binomial distribution) is used to analyze and check on the basic data collected in ratio-delay studies. Weekly plottings of the fraction downtime are made on a p chart to determine what data can legitimately be used in the computation of the allowance. The standard deviation of the binomial distribution is also used to determine the number of observations required to give a desired degree of accuracy in the allowance.

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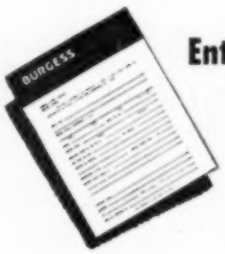

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OFFICE QUALITY—NEW WAYS TO IMPROVE IT WITH STATISTICS

(Modern Industry—v. 25, n. 3, Mar. 15, 1953, p. 50)

This article describes the application of control charts and sampling plans to office operations. The product is the paper work generated by office operations. A case study of the application of SQC to IBM operations at the Prudential Insurance Company is given. An example of a single, double, and sequential sampling table is given. The application of these techniques at many other companies is mentioned.

MISCELLANEOUS

QUALITY CONTROL—THE AIR FORCE—KOREA

(Tooling and Production—v. XIX, n. 1, Apr. 1953, p. 116)

This article outlines very briefly the theory of the quality control system employed by the Air Force Procurement.

SAMPLE PLANS AND RELATED TOPICS

STATISTICAL SAMPLING FOR AIRCRAFT ENGINES

(Tooling and Production—v. XIX, n. 1, Apr. 1953, p. 117)

This article describes very briefly a sampling plan employed on the acceptance of aircraft engines. Details are not given but savings and advantages are noted.

THEORY AND APPLICATION—GENERAL

QUALITY CONTROL METHODS,

Dorian Shainin, Chief Engineer, Rath & Strong, Inc., Boston, Mass.

(PART 9. "Trouble-Shooting Design Defects," Machine Design—v. 25, n. 3, Mar. 1953, p. 165)

(PART 10. "Operations Research," Machine Design—v. 25, n. 5, May 1953, p. 176)

PART 9. In many cases direct techniques of the control chart, etc., cannot be applied to problems resulting from certain inherent design characteristics. Methods for locating sources of trouble in assemblies or multiple operation circumstances are given.

PART 10. The principles and general philosophy of operations research are given. Ten basic steps of operations research are outlined.

THE PRACTICE OF QUALITY CONTROL, A. G. Dalton
Scientific American—v. 188, n. 3, Mar. 1953, p. 29)

Statistical quality control is presented in a general way as a new and important tool in industry. Its primary value is for giving warning of impending trouble. Illustrations of the average and range control chart, the use of the frequency distribution and sampling tables are given.

TRAINING AND EDUCATION

A MATHEMATICS FOUNDATION FOR INDUSTRIAL ENGINEERING, Howard P. Emerson, Professor and Head of Industrial Engineering, University of Tennessee
(The Journal of Engineering Education—v. 43, n. 8, Apr. 1953, p. 472)

Professor Emerson discusses the mathematical courses needed for Industrial Engineers. The place of statistical mathematics, probability theory, and quality control in this program are considered. Some of the problems in the presentation of statistical mathematics are considered briefly.

STATISTICS

COMPOSITE MEAN SQUARES AND THEIR DEGREES OF FREEDOM, L. P. V. Johnson and E. S. Keeping
(Applied Statistics—v. 1, Nov. 1952, p. 202)

ON MINIMUM VARIANCE ESTIMATORS, J. Kiefer
(Annals of Math. Stat.—v. 23, Dec. 1953, p. 627)

CONFIDENCE BOUNDS FOR A SET OF MEANS, D. A. S. Fraser
(Annals of Math. Stat.—v. 23, Dec. 1952, p. 575)

CONFIDENCE INTERVALS FOR MEDIANS AND OTHER POSITION MEASURES, R. S. Woodruff
(Journal of the Am. Stat. Assoc. —v. 47, Dec. 1952, p. 635)

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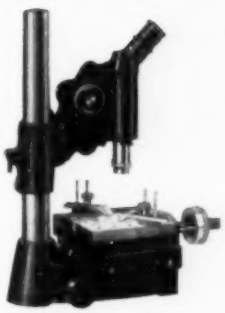

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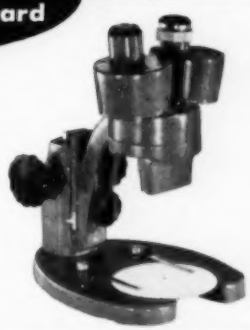

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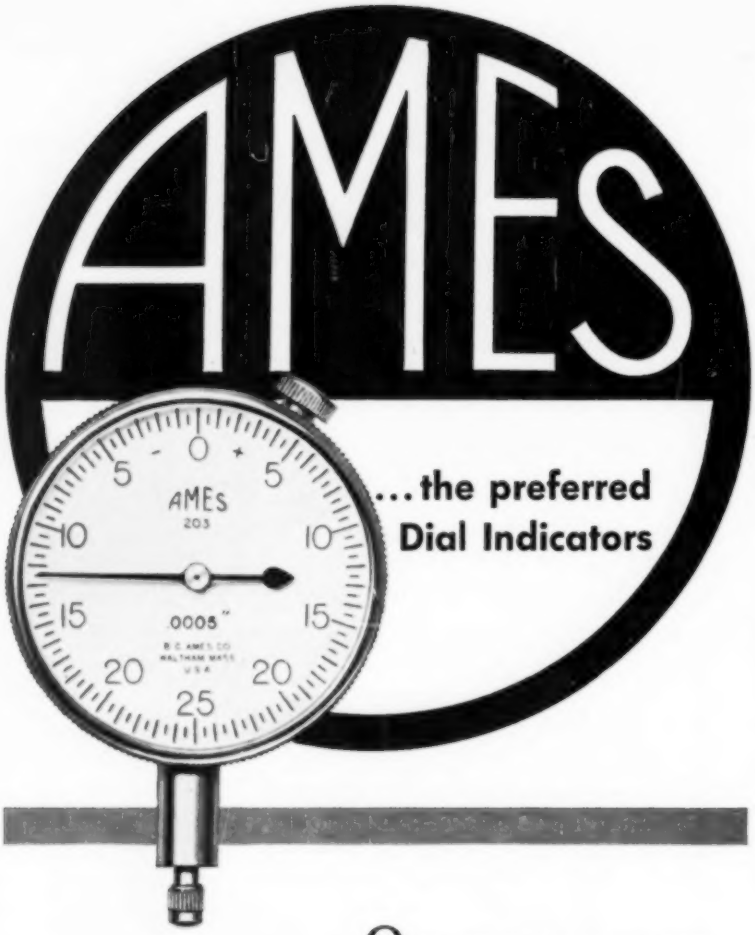

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GENERALIZATION OF SAMPLING WITHOUT REPLACEMENT FROM A FINITE UNIVERSE, D. G. Horvitz and D. J. Thompson
(Journal of the Am. Stat. Assoc. —v. 47, Dec. 1952, p. 663)

APPROXIMATIONS TO THE PROBABILITY INTEGRAL OF THE DISTRIBUTION OF RANGE, N. L. Johnson
(Biometrika—v. 39, Dec. 1952, p. 417)

STATISTICAL CONTROL OF COUNTING EXPERIMENTS, H. O. Lancaster
(Biometrika—v. 39, Dec. 1952, p. 419)

ESTIMATION BY DOUBLE SAMPLING, D. R. Cox
(Biometrika—v. 39, Dec. 1952, p. 217)

UPPER 5 and 1% POINTS OF THE MAXIMUM F-RATIO, H. A. David
(Biometrika—v. 39, Dec. 1952, p. 442)

ESTIMATION OF THE MEAN AND STANDARD DEVIATION OF A NORMAL POPULATION FROM A CENSORED SAMPLE, A. K. Gupta
(Biometrika—v. 39, Dec. 1952, p. 260)

OPERATIONS RESEARCH

PRODUCTION PROBLEMS BOW TO OPERATIONS RESEARCH, John B. Lathrop, Arthur D. Little, Inc.
(SAE Journal—v. 61, n. 5, May 1953, p. 46)

Operations Research is described briefly and presented as a tool that can be used on production and management problems. Examples of the operational research approach to several specific problems are given. These include a problem in each of the following: production and inventory scheduling, planning machine runs, determination of inspection intervals, and evaluation of a new development.

STATISTICAL METHODS AND OPERATIONAL RESEARCH IN TRANSPORT, F. A. A. Menzler
(Engineer—v. 194, Nov. 28, 1952, p. 737)

Book Reviews

A. C. Cohen, Jr., *Editor*

Correspondence and suggestions concerning book reviews should be sent to:
Professor A. C. Cohen, Jr.
Department of Mathematics
University of Georgia
Athens, Ga.

AN INTRODUCTION TO STATISTICAL ANALYSIS

Wilfred J. Dixon and Frank J. Massey, Jr. McGraw-Hill Book Company, Inc., New York, 1952. 370 + x pp. $4.50. Review by Frank E. Grubbs, Ballistic Research Laboratory, Aberdeen Proving Ground, Maryland.

This book represents an attempt to crowd into a basic or first (college) statistics course as many as possible of the non-elementary statistical techniques, but nevertheless many of the important practical ones, which have been rounded out sufficiently only during recent years. At this, it does a very good job indeed and therefore deserves notice. The approach is indicated, the reviewer believes, in a statement in the Preface. It reads: "The only mathematical ability assumed of the student is a knowledge of algebraic addition, subtraction and multiplication." Gee, fellows! Statistics is so easy—one cannot fall into deep or big ditches; all he has to do is compute some sample "statistics" according to established formulas and refer these to a magic set of tables, thereby with the expectation of arriving at proper decisions. Such would be a very remarkable advance in the application of statistical methods, but actually it represents a demand over recent years, especially in fields like quality control, which apparently the statistician by some hook or crook must satisfy! Therefore, it is not surprising at all that this book of about 360 pages is divided into a presentation of the purely mechanical aspects of statistical tests, etc., in the first 287 odd pages and some twenty six reference tables covering about one-fifth of the entire book. This type of display should therefore make the book attractive.

As previously indicated, the book contains many important practical topics; its chapters include the subjects of distributions, measures of central value and dispersion, universe and sample, the normal distribution, statistical inference, and variance and the mean in the estimation and tests of hypotheses, analysis of variance techniques, regression and correlation, analysis of covariance, enumeration statistics (i.e. the use of chi-square in contingency tables, binominal populations, the Poisson distribution and other discrete applications), probability of accepting false hypotheses, "Macrostatistics", "Microstatistics," nonparametric statistics, sequential analysis, and sensitivity experiments. Thus, needless to say, many of these topics are of interest to the quality control engineer. This, coupled with the method of presentation as described above leads the reviewer to incur a risk of appearing to favor the sale of this book to quality control engineers, as the statement in the Preface which says the text book has been written for a basic statistics course could well be revised to encompass the possibility that the book may also find application as a handbook for industrial or other investigations.

The references to statistical literature at the end of each chapter are not too well co-ordinated with the text. They amount to only a partial list of allied reading material, and many important references for the curious student are to be found only in the tables. Moreover, the usual practice in scientific fields of giving recognition to individuals who have made the more significant contributions has apparently been largely dispensed with or minimized in the written text of this work. Actually, however, it is not intended here to detract from the actual presentation of statistical principles in the book, as the authors are not to be criticized very much in this connection.

The chapter on Macrostatistics with the horrible figures of IBM equipment does not impress the reviewer favorably. Also, there are (as in every work) a few minor blemishes in the book. Concerning the statement on the bottom of page 68: "There is some objection to the use of the range as a measure of dispersion since it can be affected by a single value which may be removed a considerable distance from all other values observed," the authors should note E. S. Pearson's, "Some Notes on the Use of the Range," pages 88-92, Biometrika, Volume 37, Parts I and II, especially for small sample sizes, since usually the range will only be used in such cases. Also we cannot completely accept the curious statement "A serious disadvantage (of correlation) is the rare occurrence of populations which have bivariate normal distributions." In this connection, the facts are that approximate bivariate normal populations plague the applied statistician very often. As another example, on page 3, the reviewer thinks that the authors could well have omitted the reference to or statements on the "bazooka"; an Ordnance man would cringe at the verbiage!

As an overall appraisal, nevertheless, it should be said that the book is more or less free of common statistical errors and may, because of its manner of presentation, be of some value to quality control engineers and industrial statisticians.

NEW BOOKS RECEIVED

METHODS OF STATISTICAL ANALYSIS, Second Edition by C. H. Goulden, 1952. John Wiley and Sons. 467 + vi pp. $7.50.

STATISTICAL THEORY IN RESEARCH, by R. L. Anderson and T. A. Bancroft, 1952. McGraw-Hill Book Co. 399 + xix pp. $7.00.

THE METHODS OF STATISTICS, Fourth Edition, by L. H. C. Tippett, 1952. John Wiley and Sons. 395 pp.

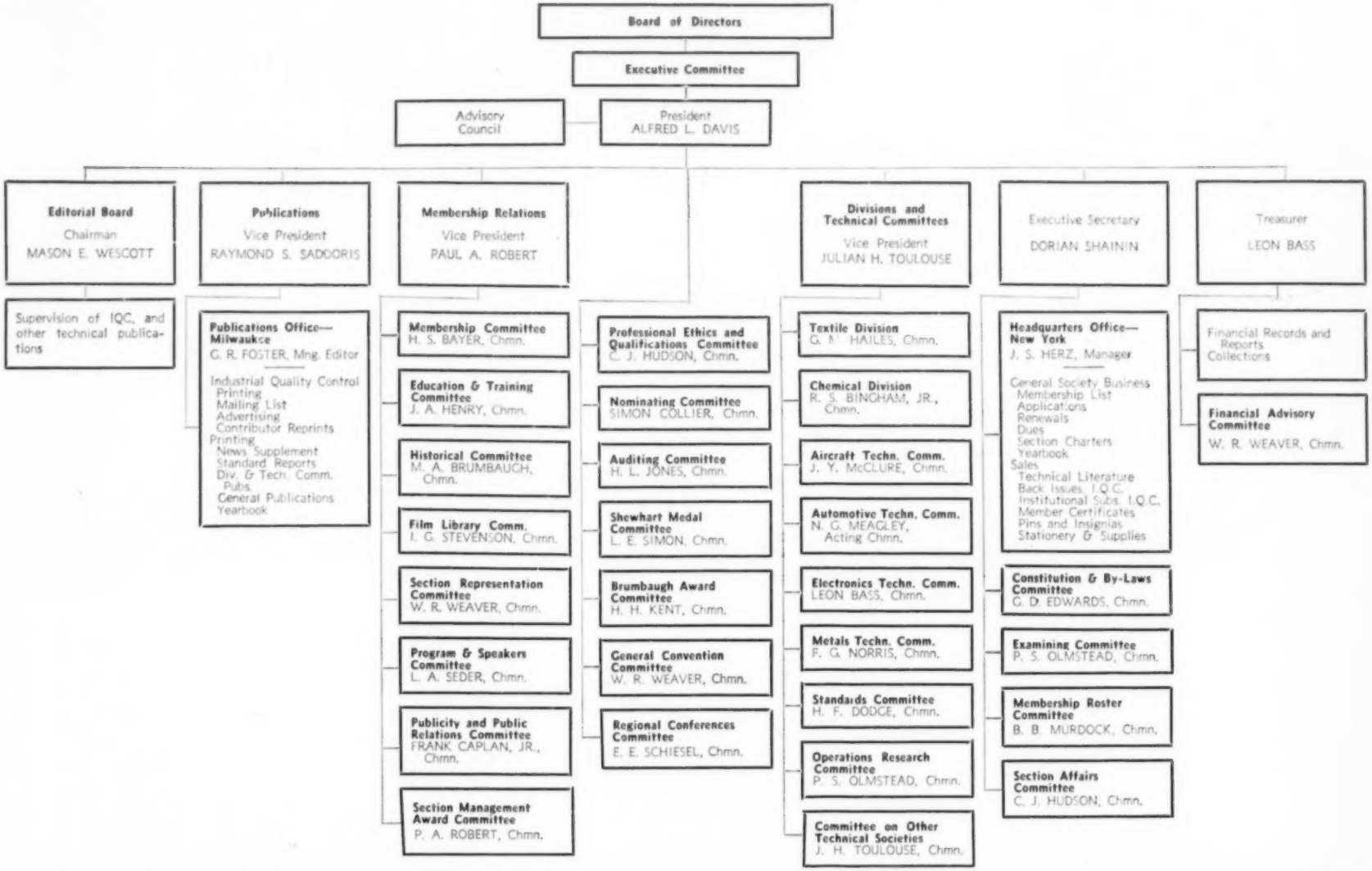
STATISTICAL TABLES AND PROBLEMS, by Albert E. Waugh, 1952. McGraw-Hill Book Co. 242 + xiv pp. $3.00.

ADVANCED STATISTICAL METHODS IN BIOMETRIC RESEARCH, by C. R. Rao, 1952. John Wiley and Sons. 390 + xvii pp. $7.50.

OPERATIONS RESEARCH, A Preliminary Annotated Bibliography, by James H. Batchelor, 1952. Case Institute of Technology. 95pp. paper bound. $1.00.

American Society for Quality Control, Inc.

ORGANIZATION CHART 1953-54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Executive Committee
Advisory Council
President ALFRED L. DAVIS
Editorial Board
Chairman MASON E. WESCOTT
Supervision of IQC, and other technical publications
Publications
Vice President RAYMOND S. SADOORIS
Publications Office—Milwaukee
G. R. FOSTER, Mng. Editor
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Printing
Mailing List
Advertising
Contributor Reprints
Printing
News Supplement
Standard Reports
Div. & Tech. Comm. Pubs.
General Publications
Yearbook
Membership Relations
Vice President PAUL A. ROBERT
Membership Committee H. S. BAYER, Chmn.
Education & Training Committee J. A. HENRY, Chmn.
Historical Committee M. A. BRUMBAUGH, Chmn.
Film Library Comm. I. G. STEVENSON, Chmn.
Section Representation Committee W. R. WEAVER, Chmn.
Program & Speakers Committee L. A. SEDER, Chmn.
Publicity and Public Relations Committee FRANK CAPLAN, JR., Chmn.
Section Management Award Committee P. A. ROBERT, Chmn.
Professional Ethics and Qualifications Committee C. J. HUDSON, Chmn.
Nominating Committee SIMON COLLIER, Chmn.
Auditing Committee H. L. JONES, Chmn.
Shewhart Medal Committee L. E. SIMON, Chmn.
Brumbaugh Award Committee H. H. KENT, Chmn.
General Convention Committee W. R. WEAVER, Chmn.
Regional Conferences Committee E. E. SCHIESEL, Chmn.
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Section Affairs Committee C. J. HUDSON, Chmn.
Treasurer LEON BASS
Financial Records and Reports Collections
Financial Advisory Committee W. R. WEAVER, Chmn.

The above chart represents the administrative organization of the Society for the year 1953-54. The organization has the approval of your new officers and the Board of Directors. You will note that the administrative load has been divided, areas of responsibility have been defined and each committee or function has been assigned to a Society officer. This officer will be the channel through which each committee will have its problems and interests presented to the President and the Executive Committee, or the Board of Directors. The mailing address of each officer will be found on page 44 of this issue. Please write the appropriate individual as you have suggestions to make which will improve the effectiveness of your Society. The meeting schedule on page 43 may help you in timing your letters so that your suggestions will receive prompt attention. The Operating Committee, while not shown as such on the chart, is composed of the officers of the Society.

AMERICAN SOCIETY NEWS

During the period since the preparation of the May issue the Executive Committee has held two meetings—one on Apr. 25 at New York City and one on May 26 just prior to the Seventh Annual Convention at Philadelphia. The major actions and announcements approved by the committee are presented here.

NEW SECTIONS

The Society takes pleasure in welcoming into its ranks the following approved new sections and their officers:

No. 67—Salt Lake City
Chairman: James C. Sorenson, Hill Air Force Base, Ogden, Utah
Vice Chairman E. Elroy Nelson, University of Utah
Secretary: Robert A. Cromar, United Air Lines
Treasurer: George B. Brown, Col-Geneva Steel

No. 68—Grand Rapids
Chairman: R. H. Stewart, Lear, Inc.
Vice Chairman: F. D. Sweeny, General Motors Corp.
Sec'y.-Treas.: Elton A. Mirandette, Nash-Kelvinator

No. 69—New Haven
Chairman: Welton D. Parker, Rockbestos Products Corp.
Vice Chairman: (not filled)
Secretary: Thomas O. Drinkwater, Olin Industries
Treasurer: Walter H. Bacon, High Precision, Inc., Hamden, Conn.

No. 70—Youngstown
Chairman: H. C. Dunkle, Republic Steel Corp.
Vice Chairman: P. H. Hardy, General Electric Co., Warren, Ohio
Secretary: George H. Firth, Commercial Shearing & Stamping Co.
Treasurer: V. P. Ahier, Truscon Steel Co.

No. 71—Carolinas
Chairman: R. C. Tanner, Fieldcrest Mills, Leaksville, N. C.
Vice Chairman: John P. Elting, Kendall Mills, Paw Creek, N. C.
Secretary: Percy W. Woodruff, Jr., Erwin Mills, Durham, N. C.
Treasurer: George E. Archer, Uster Corp., Charlotte, N. C.

In announcing these new sections we wish to commend particularly the New Haven and Youngstown sections since this represents a step up from their previous sub-section status.

In accordance with the policy established during the past year of restricting the names of sections to one or two cities in the area served by the section, it should be pointed out that the Carolinas Section was accepted with the understanding that whenever another section is formed in their area they will so change their name.

In addition, requests for information about how to organize a section have been received from the following cities:

Harrisburg, Pa.
Baton Rouge, La.
Portland, Ore.
Charleston, W. Va.
Tucson, Ariz.
Lima, Ohio

COMMITTEE APPOINTMENTS

Editorial Board

In line with the established rotation plan, the following men have been appointed to serve on the Editorial Board for five-year terms effective July 1, 1953:

Acheson J. Duncan
Paul S. Olmstead
William R. Pabst

The three members whose terms expire at this time are:

Cecil C. Craig
Joseph M. Juran
Leslie E. Simon

Tellers Committee

The following were appointed to the Tellers Committee for the annual election of officers:

August B. Mundel, Chairman, Metropolitan Section
Philip B. Proctor, Metropolitan Section
Ernest H. Robinson, Chicago Section
Clarence R. Burdick, Michigan Section
Leonard A. Seder, Boston Section

Brumbaugh Award Committee

It was decided that the chairman of the Editorial Board shall be an ex officio member of the Brumbaugh Award Committee but that he shall not be eligible to serve as chairman of that committee.

Other Committees

In addition to the appointments reported above, it has been necessary to appoint several other committee chairmen due to the changes brought

Meeting Schedule 1953-54

Items for the agenda for any meeting must be in hands of president two weeks before date of meeting.

1953			
July	25	Operating Committee	Rochester, N. Y.
Sept.	19*	Operating Committee	Michigan Forum
	20	Executive Committee	Ann Arbor, Mich.
Nov.	5*	Operating Committee	New England Conference
	6*	Executive Committee	Providence, R. I.
	7*	Board of Directors	
1954			
Feb.	16*	Operating Committee	Rochester Clinic
	17	Executive Committee	Rochester, N. Y.
Apr.	10	Operating Committee	Rochester, N. Y.
June	8	Operating & Executive Comms.	
	9*	Annual Meeting of Society	8th National Convention
	10*	Annual Banquet	St. Louis, Mo.
	11*	Election of New Directors	
	12	Board of Directors	

* Date of Forum, Conference, Clinic, or Convention

about in the transition to the new group of officers. These chairmen for 1953-54 are shown on the Society Organization Chart on page 42.

NEW OFFICERS

The Organization Chart referred to above is presented primarily to indicate the distribution of duties and areas of responsibility for each of the Society officers. Your new officers whose election was announced at the Annual Banquet on May 28 are:

President:

Alfred L. Davis, Rochester Institute of Technology, Rochester, N. Y.

Vice Presidents:

Paul A. Robert, International Business Machines Corp., Endicott, N. Y.

Raymond S. Saddoris, A. O. Smith Corp., Milwaukee, Wis.

Julian H. Toulouse, Owens Illinois Glass Co., Toledo, Ohio

Executive Secretary:

Dorian Shainin, Rath & Strong, Inc., Boston, Mass.

Treasurer:

Leon Bass, General Electric Co., Syracuse, N. Y.

BRUMBAUGH AWARD AND SHEWHART MEDAL FUNDS

The contributions indicated below have been received from the following sections:

	Brumbaugh Award	*Shewhart Medal*
Milwaukee	$100.00	$50.00
Mid-Hudson	10.00	10.00
San Francisco Bay	33.50	16.50
Rhode Island	25.00	25.00
Western Massachusetts	25.00	12.50
Cincinnati	25.00	25.00
Southern Connecticut	25.00	....
Muncie	24.00	12.00
Syracuse	50.00	25.00
Rochester	100.00	....

In accepting these contributions your Executive Committee wishes to express its appreciation for the fine response on the part of the sections to the announcements which were published in the March and May issues. Since the publication of these announcements, it has come to the attention of your committee that several sections have wondered whether or not these funds could be brought up to the required level by an outright transfer of money from the national treasury. The answer, of course, is that while such a transfer would be possible, it would be most undesirable because it would defeat the purpose for which these funds were established.

In order to better understand this purpose your committee wishes to restate here the philosophy behind these awards. In setting up both the Shewhart Medal and Brumbaugh Awards the aim was to honor some member of the Society for his outstanding work and contribution to the field of SQC. Like any award, the real value of the honor stems not from the cash award nor yet from the intrinsic worth of the "scrap of paper" which is presented but rather from the wholehearted esteem of all of the members in whose name the award is made. In order, therefore, to truly honor those individuals who are selected to receive these awards, it is necessary that the funds from which these awards are made be subscribed to by individual members and sections. Only in this way can these awards be an equally true expression of the esteem of the entire membership.

PUBLICATIONS AVAILABLE

Two new Society publications and one from outside the Society are now available through the New York office.

The first of these is the first report of the Standards Committee, A1-1951, *Definitions and Symbols for Control Charts.* As was announced in the March issue one copy of this report is being automatically sent to each member of ASQC. Additional copies can be ordered at 50 cents each.

The second booklet is the first one to appear in the General Publications Series which was recently authorized by the Executive Committee. This is General Publications No. 1, *Manual on Sampling Inspection by Military Standard, MIL-STD-105A,* and will not be sent out on free general distribution. It is available at $1.00 per copy.

The third booklet, which is available in limited supply, is Vol. 1 *What and Why* of the Manual on Statistical Quality Control published by the National Screw Machine Products Association. These are available at $1.00 a copy.

In the next issue of IQC will be published a complete stock list of all of the available publications.

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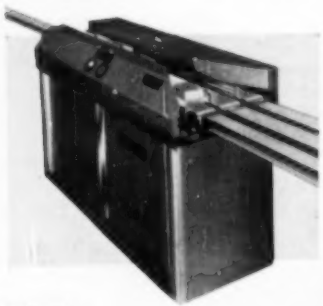

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PLANS FOR IQC

In view of the rapid growth of ASQC and of the corresponding need for improved service to its members, your Executive Committee is currently considering several possible plans to further expand *Industrial Quality Control* to meet this need. For the immediate present it has authorized an increase in the magazine size from 52 to 68 pages, beginning with the next issue. In addition, it has authorized the Editorial Board to investigate the feasibility of publishing smaller sized monthly issues and the timing attendant upon making a transfer to such a schedule.

SECTION MANAGEMENT AWARD

Also approved by the Executive Committee at its May meeting was the establishment of the Section Management Award which will be presented each year to the three top sections for excellence in handling their affairs. Administration of this award will be handled by the Section Management Committee, Paul A. Robert, Chairman. Although complete details on the award will be sent directly to all section officers, a brief mention of its functioning should be made here.

The committee has set up a schedule of points for each of the areas of activity ordinarily engaged in by the sections. During the year each of the sections will receive points based on its own activities in accordance with the published schedule. Points will be given for such things as attendance at meetings, participation in or sponsorship of short courses, conferences, clinics, etc., publication of members' articles in IQC or other journals, and assistance in establishing sub-sections or sections. At the end of the year, first, second and third awards will be made to the three sections having the largest total number of points.

MEMBERSHIP CERTIFICATES

As announced in the March issue of IQC, Membership Certificates are now available on request to the New York office at a cost of $3.00. Members desiring certificates are requested to place their orders as quickly as possible so that they may be processed during the relatively slack summer months. In placing your order please indicate your name as you wish it to appear on the certificate and indicate also your section affiliation.

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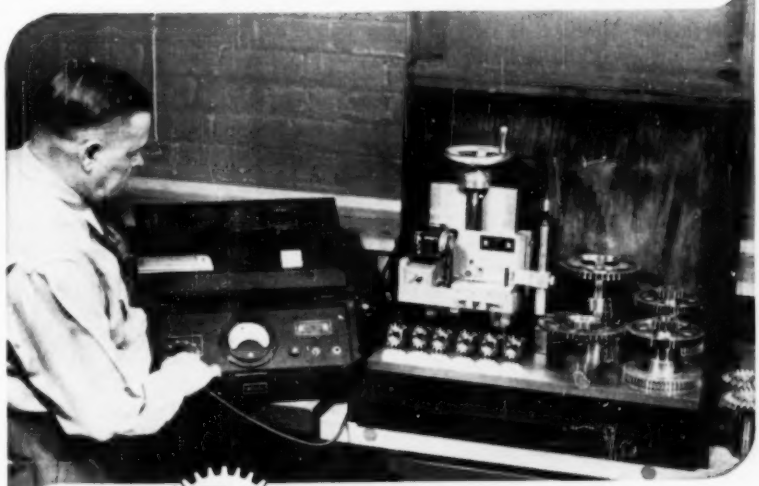

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A specific example is Enterprise production of jet timing gears—shown being checked above. On the timing gear face the specified surface finish is held to a maximum of 8 microinches. Gear teeth are held to 10 to 15 microinches and counter bore face is held to 8 microinches! Enterprise finds that on this one jet part alone—the use of the Profilometer has reduced the grinding time 75%! "Accurate surface measurement is essential in our production and the Profilometer gives us surface finish readings in seconds from actual grinding operations," says Enterprise.

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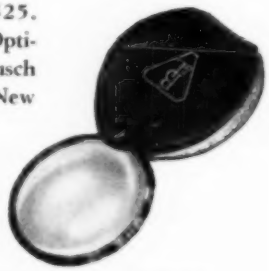

BAUSCH & LOMB
Industrial Magnifiers

FELLOWS

On the recommendation of the Examining Committee the following 15 men have been elected Fellows of ASQC during the past year:

Wendell H. Abbott, General Electric Co., East Cleveland, Ohio
Frederick R. Bailey, Electric Storage Battery Co., Philadelphia, Pa.
Leon Bass, General Electric Co., Syracuse, N. Y.
Albert H. Bowker, Stanford University, Stanford, Calif.
Edward R. Close, Hilton, N. Y.
Alfred L. Davis, Rochester Institute of Technology, Rochester, N. Y.
A. V. Feigenbaum, General Electric Co., Cincinnati, Ohio
Emil F. Gibian, Thompson Aircraft Products, Cleveland, Ohio
Paul E. Gnaedinger, Dominion Rubber Co., Ltd., Montreal, Canada
William P. Goepfert, Aluminum Company of America, Pittsburgh, Pa.
Aldis S. Hayes, Perfect Circle Corp., Hagerstown, Ind.
John D. Heide, U. S. Rubber Co., Passaic, N. J.
Gayle W. McElrath, University of Minnesota, Minneapolis, Minn.

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June 30, 1952: 6109
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August B. Mundel, Sonotone Corp., Elmsford, N. Y.
John G. Rutherford, Glenn L. Martin Co., Baltimore, Md.

MEMBERSHIP CORNER

Although the main body of any society views the summer months as a vacation period from such activities, these months are the most crucial for the section leadership. It is during the summer months that firm plans must be laid to assure a successful season starting in September and ending in June. ASQC sections are no exception to this rule and the membership committees in particular must realize that the success of any program must be determined during the next few months.

Briefly, the plans should revolve around the following:

New Member Activity: One of the greatest sources of potential members is the list of visitors to section meetings. An effective technique found by many sections is to give to each visitor a guest card which describes the society and its benefits. The guest fills in his name, address and company affiliation on a space provided on the card, tears off the part describing the society for his further reading and turns in the portion which contains his name. The membership committee sends out further information using the list obtained in this manner. The summer months are therefore important since the composing and printing of these cards and follow-up letters should be undertaken at this time. It has been found that an economical method of preparing follow-up material is by printing, mimeographing or multilithing follow-up letters describing in detail society services on a local and national plane. The committee merely addresses and mails out these prepared letters along with the yearly program and any other descriptive paraphernalia, such as the national information folder.

This brings out one very important point. A membership committee can only be effective when the rest of the section functions effectively. It has been found that membership

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committee activities are enhanced considerably when the membership committee can include a printed program schedule for the entire season. This too should be accomplished during the summer months and be completed by the start of the fall season.

It has been noted that the foregoing methods for obtaining lists of potential members should be supplemented by effective general publicity of society activity and with names provided by the general membership. Some sections have found it very effective to work through the local Manufacturers' Associations, Chambers of Commerce, and like organizations.

Retaining Old Members: Increasing the membership is made more difficult if the section finds its old members failing to renew. This problem seems to be increasing even though our general membership continues to expand. Some sections have found the following techniques effective in retaining members.

Before the final due date (October 31st) the secretary of the society sends a reminder of the benefits of the society to all delinquents. After the due date he turns over a list of delinquents to the membership committee. The committee sends out a letter further describing the benefits of the society and urges the delinquent to renew. They request that he fill out an enclosed questionnaire concerning his reasons for not renewing. A second letter similar to the first is sent out about one month later, if necessary.

Finally the list is divided among the members of the membership committee to personally contact each member who has not renewed to date. This personal contact has also proven effective. One membership committee found that the foregoing techniques resulted in renewing approximately 90% of the delinquents.

One can appreciate that the techniques outlined take work and planning. This is true. Membership activities must be positive and entail considerable follow-up work. To attack the problem from any other base has proven ineffectual. Section Chairman should be sure that they appoint a membership chairman who is willing to expend a considerable amount of effort and that he in turn picks committee members of a like nature. Of prime importance to the next year's membership chairman should be the realization that *now* is the time to make plans for next year's membership activities.

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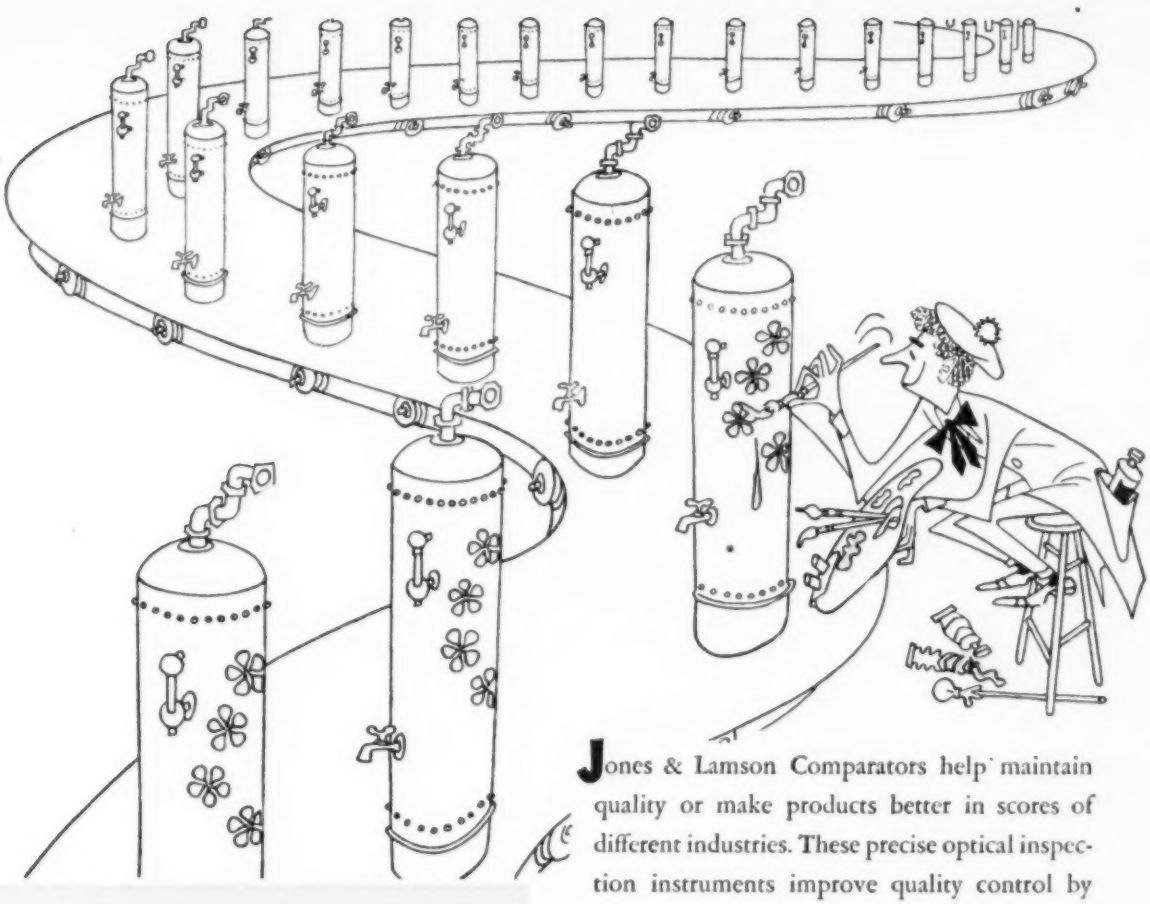

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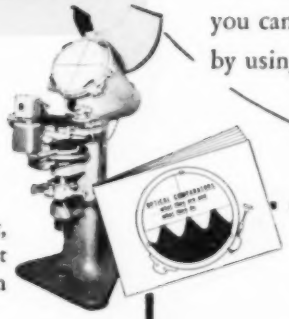

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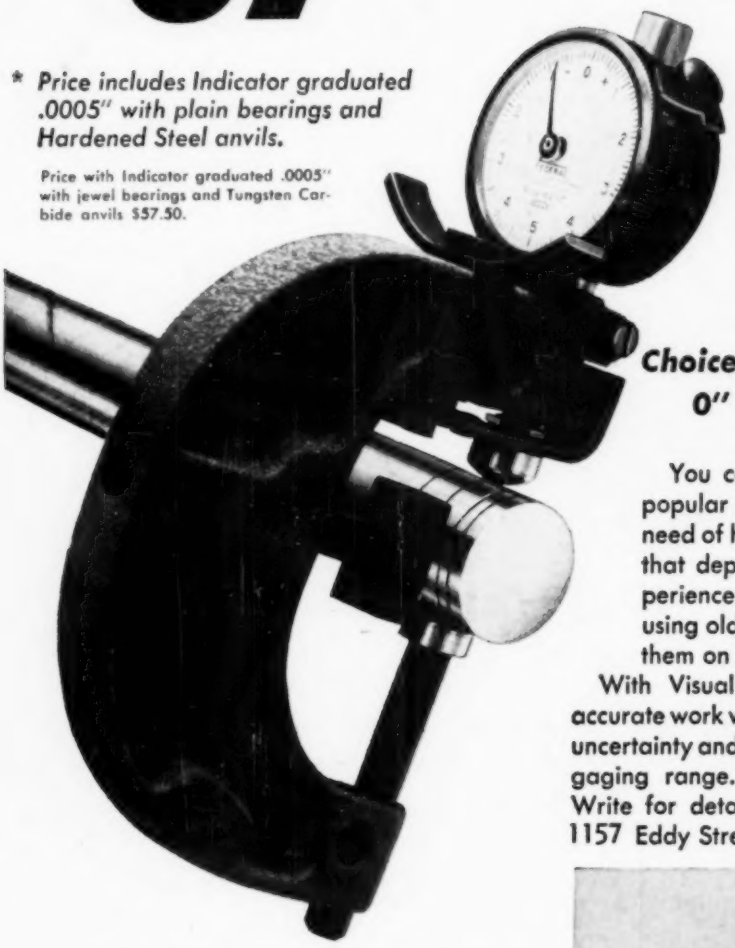

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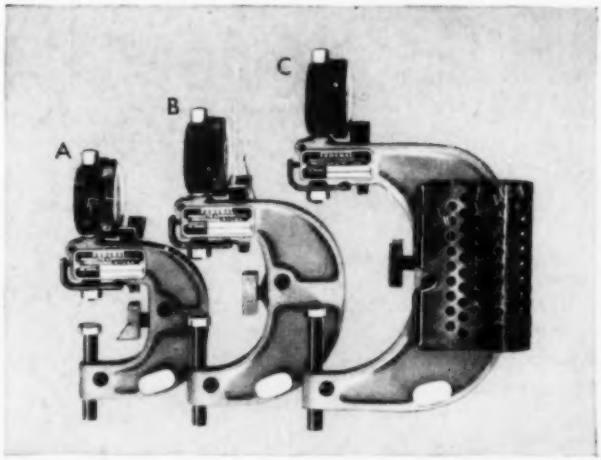

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